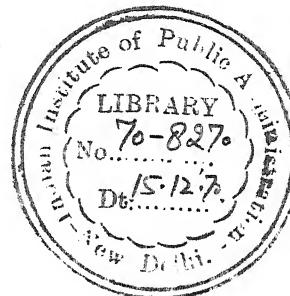


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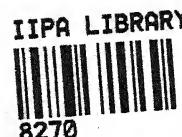
READINGS IN THE  
OPERATIONAL PROBLEMS  
OF  
PUBLIC ENTERPRISES

VOLUME I



By

G. P. KESHAVA, Ph.D.



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*This book is dedicated to  
Late Dr. Parmanand Prasad  
formerly on the staff of  
The Patna University*

## FOREWORD

With the increasing importance of public enterprises in the Indian economy a stage has come when research in the details of their working should be undertaken. In particular, problems bearing on their operational efficiency and financial management need to be studied at length.

The present work deals with some of the rather complex issues relating to the management of public enterprises in India. The opening essay is in two parts. In the first part, the author suggests a methodology for the assessment of the management's performance in public enterprises, referring, at the same time to the corrective measures that need to be taken for improving the same. In the second part, he points out the implications of applying this methodology in a few selected enterprises. The next essay is devoted to a detailed discussion of the methodological and statistical problems arising in the course of the measurement of the management's contribution to profitability of one public enterprise—the Bihar State Road Transport Corporation. Apparently, the task of quantifying the criteria for the assessment of the management's performance, is beset with numerous hurdles. It is interesting to see how the author grapples with them and finally arrives at an acceptable solution.

In the essays that follow, the author recommends a few corrective measures for improving the financial performance of public enterprises. Whereas a lot has been written on policy considerations bearing on pricing in public enterprises, little attention has been directed to the administrative problems arising in the course of the implementation of the pricing policies with a view to securing the desired financial re-

sults. In order to ensure that the financial goals of government's investments are realised, the management should keep a strict watch on the relevant variables and take adequate measures to neutralise the effects of unforeseen elements on them.

The last essay highlights some of the practical problems of research on public undertakings. In a broad sense micro-studies of public enterprises can be put in the category of survey research. Nonetheless, there is a certain measure of uniqueness in the problems arising in the course of research on public undertakings which distinguishes it from survey research in general.

There is a certain measure of freshness in the essays included in this book insofar as they deal with some of the less discussed aspects of the working of public enterprises in India. I have no hesitation in recommending it to the students as well as practitioners of public administration.

J. N. KHOSLA

New Delhi,

1-5-1969.

Director,

The Indian Institute of  
Public Administration,  
New Delhi-1.

## INTRODUCTION

The general atmosphere in which the management of the public enterprises in India functions is by no means very healthy. On the one hand it has to face a certain amount of hostility from different sections of the intelligentsia. The press and the public often suffer from a bias against the public enterprise sector arising from the ideological considerations. Even the civil service from which the majority of the management personnel of these enterprises are drawn seldom display an objectivity in their attitude towards them, partly owing to professional rivalries. On the other hand, the Government is ever keen to retain its hold on these enterprises as a result of which the management has to operate under severe constraints.

As a result of all this, the management of public enterprises is put to a lot of unfair criticism. No systematic study of the evaluation of performance of the management in the public or private enterprises in India has been undertaken so far. The existing theory of the firm, of course, suggests a few criteria for judging the efficiency of an enterprise. According to it, an enterprise would be regarded as efficient if

- (1) the net earnings or surpluses of the enterprise are not lower than normal profits, and
- (2) the enterprise is producing its output at the minimum cost, i.e., the long term average cost.

The above may be deemed as constituting the sufficient conditions of efficiency. Differences in the level of earnings of different enterprises in an industry at a given time would indicate their relative efficiency. But so long as an enter-

prise is fulfilling the above conditions, it may well be regarded as efficient.

The theory of the firm, however, does not go into the details of explaining the role of the various factors to changes in the efficiency of the firm. It only gives, so to say, a framework for expressing the end results of the contributions of different factors to the same. Apart from profitability, changes in the efficiency of the firm would be measured in terms of changes in the average cost of production, (which would obviously bear upon profitability as well). From this one could derive a broad criterion for judging the performance of the management in terms of cost reduction. In other words, the efficiency of the management can be judged in terms of its contribution to change in productivity.

The application of the above criteria in the case of the management of the public sector enterprises is however obstructed by the fact that the assumptions underlying the neo-classical theory may not be realised in the case of public enterprises. And this is on account primarily of two kinds of factors, viz., (1) the multiplicity of the objectives that the management of these enterprises may have to pursue and (2) the large range of explicit and implicit constraints under which it has to operate. These factors may well negate the assumption of "economic rationality" underlying the neo-classical theory. Increasing the profitability of the enterprise is just one of the many objectives that the management of public enterprises may have to pursue. Not unoften the management of these enterprises has to pursue a large range of non-financial objectives, many of which arise from the explicit and implicit control of the Government over their operational and policy matters.

On account of the above it is necessary to design a methodology for the assessment of the management's performance taking into account the actual conditions under which these enterprises have to function. While the significance of an attempt in this direction from policy considerations is

obvious, from the viewpoint of theory, it may well contribute towards bridging the gap between the existing theory of growth and the micro-economic theory of the firm. It has no doubt been one of the major concerns of the theory of economic growth to provide an explanation of the causes of the growth of income and wealth. However, the contribution of individual factors to economic prosperity does not appear to have been studied adequately. In particular, the role of the management as an independent factor of production to the generation of income and wealth needs to be studied in greater detail. Neither the micro analysis of the equilibrium of the firm and industry, nor the macro-economic models of growth seem to give an explicit place to management as a factor contributing to change. Measurement of the management's contribution to profitability and productivity is likely to pave the way towards integrating the theory of the firm with the theory of economic growth and would thereby contribute towards the development of an integrated theory of economic administration.

The present work opens with an essay on "Appraisal of the Management's Performance in Public Enterprises" which suggests a methodology for the measurement of the management's performance in public enterprises. Without getting involved much into definitional questions, an attempt is made to evolve a structure of criteria for assessing the management's performance. The second essay bearing the same caption explores the possibilities in respect of the application of these criteria in a few selected enterprises belonging to different industries. For obvious reasons, the extent to which the criteria for the assessment of the management's performance can be applied to the public enterprises would depend upon a number of factors, e.g., (1) the measurability of outputs and costs, (2) the ratio between overheads and current costs and (3) the extent to which overhead costs are of the nature of joint costs. A number of enterprises having different technical characteristics of production have been chosen to illustrate the feasibility of applying the criteria suggested in the preceding essay.

The third essay gives a resume of an exercise in statistical methodology undertaken to measure the contribution of the management to change in the profitability of one public enterprise—the Bihar State Road Transport Corporation. Profitability is only one of the criteria for judging the management's performance. Nonetheless, it is a very important criterion insofar as the end results of the management's performance in a number of directions (e.g. cost reduction) get reflected in it. The essay in question narrates the processes by which the statistical methodology was developed for this task, the practical difficulties in applying it, and the process by which these difficulties were overcome.

The fourth and the fifth essays deal with financial management relating to pricing and budgeting respectively. One of the important factors on which the financial success of an enterprise would depend is the relationship between the Government and the management of the enterprise on questions relating to price fixation. The essay on pricing investigates some of the administrative factors responsible for the low profitability of public enterprises and suggests remedial measures for the same. The essay on budgeting examines the philosophy behind the existing budgetary practices in public enterprises explaining the consequences of the same on the financial results and operational efficiency of these enterprises. It further suggests the steps which need to be taken to give a business reorientation to the existing budgetary practices in public enterprises.

The last essay departs from the main theme of the book and seeks to throw light on the practical problems of research on public undertakings. Research on public enterprises has so far been, by and large, confined to the general problems of organisational structure and accountability. It is only now that attention is being directed to the problems relating to their finances and operational efficiency, studies of which necessitate a detailed investigation of their working. An effort in this direction throws up problems of its own kind which are discussed in some detail in this essay.

A large part of this work was completed when I was a Senior Research Fellow in the Indian School of Public Administration (now defunct) during 1964-66. The subject of my work was "Measurement of the Management's Efficiency in Public Enterprises". The project envisaged a special study of the Bihar State Road Transport Corporation. The statistical results obtained from the investigations based on the methodology given in the third essay have not, however, been included in this book. Recently, the Planning Commission have sponsored a more detailed study of this enterprise and it is proposed to bring out another volume containing the statistical results of the inquiry into the working of the Corporation.

The essay on "Research on Public Undertakings: Some Problems of Methodology" was originally prepared for a seminar on "Methodology of Economic Research" held at Patna in March 1966 under the auspices of the A. N. Sinha Institute of Social Studies.

G.P. KESHAVA

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# APPRAISAL OF THE MANAGEMENT'S PERFORMANCE IN PUBLIC ENTERPRISES

## ( PART I )

The problem of measuring the management's performance in the public sector is much more difficult than in the private sector. Absence of objective tests for the purpose often gives rise to unfounded allegations against the management, which on closer examination, may turn out to be rather unjustified. Not unoften, the performance of the management in the public sector is judged on the same criteria as are generally applicable to private enterprises. One such criterion is that of profitability. The management of not a few public enterprises has been subjected to bitter criticism for its inability to ensure adequate financial returns on the capital invested in the enterprise. Criticisms on this ground are, however, seldom based on an adequate appreciation of such relevant factors as the long period of gestation of investment and the obligations of the enterprise in regard to the welfare of the employees. On the other hand, the accrual of appreciable financial returns tends to be regarded as an index of the management's performance whereas it may be just because of the monopoly market situation of the enterprise that the results in question are realised.

This paper deals with some of the methodological and administrative issues relating to the appraisal of the management's performance in the public enterprise sector in India. The first section is devoted to some conceptual problems arising in this connection. In the next section the criteria for measuring management's performance are discussed. The third section deals with some general issues pertaining to

appraisal on the basis of the criteria suggested in the previous section. The next two sections explain the type of statistical analysis that would be needed for the purpose. In the last section, an attempt is made to bring out some of the administrative implications of undertaking this task on an organised and institutional basis.

### 1. Concept and Focus

At the outset it may be useful to define the term "management" with reference to a public enterprise. What is usually known as the "management" of a large organisation is usually a fairly vast and complex structure, consisting of various levels of decision making. The performance of each level of management, comprising a distinct level of decision making, can be evaluated with reference to the responsibilities that it is expected to discharge. Thus, if the management is looked at as a structure, the performance of management tends to become a nebulous concept unless we evolve a method of synthesizing the performance of the different levels of management into a composite index, which, of course, is a logically impossible task.

Within the management structure, however, usually there is a definite hierarchy characterised by accountability of each level of management to the next higher level, on the one hand, and the authority exercised by each level of management over the lower level, on the other. The ultimate responsibility for the performance of each level of management is borne by the decision making authority at the top level, which in the case of public enterprises may consist of the control board or the chief executive, or both, depending upon the distribution of authority between the two.<sup>1</sup> If managerial authority is looked at as flowing from or converging on one single body, the management of the enterprise can be identified with that single body or authority. In what fol-

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1. In a typical company-type organisation, the control board would consist of the Board of Directors and the Managing Director would be the chief executive.<sup>2</sup>

lows, the term "management" will be used to signify the top decision making authority in the enterprise.

The performance of the management of the enterprise, defined in this way, needs to be distinguished from the performance of the enterprise as such. This is important because much of the presently existing confusion and loose thinking on the question can be attributed to an inadequate appreciation of the difference between the two.

Basically, the difference between the performance of the management and that of the enterprise in its entirety may be said to flow from the fact that judgment in regard to the latter implicates a wider focus of inquiry than that in regard to the former. Management is just one agent of production, whereas the enterprise represents a combined operation of a number of agents of production. The performance of the management has to be evaluated with reference to the limited role that it has to perform in the enterprise, as one agent of production. In evaluating the performance of the enterprise, however, the end results flowing from the operation of the enterprise have to be judged not only with reference to the immediate possibilities in this regard but also with reference to what would have been achieved if the scarce resources invested in the enterprise were shifted to some other activities.

The validity of this distinction flows from the fact that in the case of most enterprises there is a technical line of demarcation between the management of the enterprise and the Government, represented by the parent Ministry. From the administrative point of view it is an important distinction because it delineates the area of authority between the Government and the management of the enterprise. It is true that the manner in which the top management frames its decisions is often such that the distinction gets blurred. But conceptually the distinction will stay valid so long as it is possible to make the (reasonable) assumption that people represented on the control boards of these enterprises do not confuse between their loyalties to different organisations in which they are simultaneously represented.

The necessity for this distinction arises from the fact that the concept of management's performance with reference to public enterprises will tend to become vague unless a distinction of this kind is made. It would obviously be unfair and wrong to judge the performance of the management without a reference to the range of its responsibilities and discretion. The Government invariably exercises a large and varied range of controls over the public enterprise. The management has to function within the framework of these controls and thereby there is an inevitable restriction on its activities both in respect of the end results that it should aim to realise and the steps that it can take to realise these end results. The performance of the management of the enterprise should be judged keeping in view these explicit and implicit constraints on the activities of the management. Unless these constraints are taken into account in judging the performance of the management, there would always be the danger of unduly discrediting the management for the failures of the enterprise.

## 2. The Criteria of Performance

The range of responsibilities or obligations with reference to which the performance of the management has to be evaluated, are likely to flow a good deal from the explicitly or implicitly laid objectives which the enterprise is expected to serve. These objectives may cover various facets of the operation of the enterprises, e.g., earning of surpluses, distribution of the output of the enterprise and generation of non-vendible benefits. In a way, these objectives may be regarded as constraints on the ambit of managerial discretion, for the management has to ensure that the policies adopted by it conform to these objectives. In fact, one of the important differences between the private and public enterprise emanates from this very fact that whereas in the case of the former, the focus of the objectives (immediate or ultimate) of the enterprise is generally on profit maximisation, in the case of the latter these objectives may be multiple and diversified.

The implication of the above, in the present context, is that the criteria for the appraisal of managerial efficiency in

the case of public enterprises would have to be related to the complex of objectives. Since these objectives are not likely to be alike in the case of all enterprises, it would not be possible to lay down a uniform set of criteria which is applicable to all enterprises. Yet, giving due cognisance to the legitimate rights of the investor (i.e., the Government) to determine the objectives that the public enterprises must fulfil, and the inherent characteristic of the enterprise as a business undertaking, it should be possible to lay down a general scheme of priorities in regard to these criteria. It is important to lay down priorities because the obligations of the management in different directions may not all be consistent with each other, and to the extent that there is inconsistency between them, a judgment would have to be made on the relative importance of these objectives.

Broadly, the performance of the management of a public enterprise may be judged on the basis of the success achieved by it in four directions, in the priority indicated below:

- (1) realisation of the non-financial objectives of the enterprise as specified by the Government;
- (2) maximisation of the profits within the constraints of Government's directives in regard to non-financial as well financial matters;
- (3) improvement in the quality of products;
- (4) economy in the use of resources, i.e., inputs.

The justification for putting the profitability in the second place of priorities lies in the primacy of non-official objectives in the establishment of public undertakings. This is more marked in the case of public utilities and transport. It is true that the public enterprise being a business undertaking must be run on commercial lines, but quite often the basic *raison d'être* behind the establishment of the enterprise is something other than earning of profits. These objectives may well be such as to come into conflict with the financial objectives emanating from the commercial principles of operation and to the extent to which this is so, the commercial objectives must necessarily be subordinated to the non-commercial objectives.

Maintenance of quality of products is an important dimension in which the responsibility of the management extends. To a certain extent there may be a case for giving it a higher priority than what is indicated above. In the case of many enterprises, the nature of the product may be such as to justify giving a high priority to this aspect of managerial responsibility. But, by and large, it would be reasonable to assume that maintenance of quality and realisation of profits are linked with each other, in the sense that the success achieved by the management in maximising its profits would depend a good deal on its ability to maintain and improve the quality of the products of the enterprise. As such the performance of the management on the commercial front is likely to provide an implicit measure of its performance in respect of maintenance of quality of products.

On the other hand, giving a higher priority to quality criterion may well amount to undermining the commercial criterion. By its very definition, a public enterprise is a commercial undertaking and as such maintenance and pursuit of commercial objectives has to be an important obligation of the management, within, of course, the constraints imposed by the wishes of the investor. Since there is a possibility of a conflict between the quality and the profit criteria, in the sense that after a certain point improvement in quality might impinge upon the profit objective, it is necessary to give a higher place to the profit criterion than the quality criterion in the referent scheme of priorities.

The criterion of economy emphasizes the obligation of the management to make continuous endeavours towards reducing the cost of production. To a certain extent it is related to, and is a part of the profit criterion, in the sense that the success of the management in augmenting the surpluses of the enterprise would, to a significant extent, depend upon its ability to reduce the cost of production. But cost reduction is only one of the ways, though a very important one, of improving profitability. Better planning of sales, manipulation of tariffs and exploitation of new markets are some of the other methods by which the surpluses generated by the enterprise may be improved, (without taking resort to monopolis-

tic exploitation). Further, a blind attempt at cost reduction may well come into conflict with both the non-financial and financial objectives. In view of these, it would obviously be improper to assign primacy to cost reduction criterion over the surplus criterion in laying down the priorities among them.

The basic idea behind the above scheme of priorities is that the performance of the management of public enterprises should be evaluated with reference to the ambit of discretion of the management in policy formulation, on the one hand, and the explicit constraints on the commercial objectives of the enterprise, as determined by the Government, on the other. The usual commercial criteria for judging managerial performance in business undertakings need to be modified in the case of public enterprises, in the light of the non-financial objectives determined by the Government. In the absence of such non-financial objectives which come into conflict with the commercial objectives of enterprise in terms of earning of surpluses, the performance of the management should be judged primarily on the basis of its success in earning surpluses.

The performance of the enterprise on each of the above criteria taken individually would provide a picture of what the management has been able to do in different directions. The picture so emerging would be in a way piecemeal and diffused in character insofar as it would not by itself, provide an overall picture of the management's performance. Assessment of overall performance will necessitate some further processing of the data in regard to the management's performance in different directions taken individually.

The performance of the enterprise on each of the criteria mentioned above would broadly consist of two parts: (1) those which are related to the performance on other criteria either as a cause or as an effect, and (2) those which do not have any such inter-relationship, and are therefore "independent". To the extent that the performance on different criteria are inter-related, it would be necessary to devise a method for making a judgment on the implications of any given category

of inter-related performance on different criteria from the viewpoint of overall performance. With reference to any such category, the performance on only one criterion should be taken into account for the purpose; otherwise there will be an obvious danger of being trapped into double-counting. The criterion, the performance on which is to be taken into account in such cases, should be decided in the light of the structure of priorities indicated above. The nature of performance on the criterion having the highest priority in the inter-related category might be taken as an indicator of the overall performance of the enterprise, insofar as the particular category in question is concerned.

An exercise on the above lines would resolve a substantial part of the ambiguities arising from the multiplicity of criteria in the process of evaluation of overall performance of the management. Yet, even after this process of rationalisation, the performance of the management on the different criteria are not likely to get reduced to that on one single criterion so as to give an unambiguous indication of the overall performance of the enterprise. The possibility of part of the performance on some criteria being independent of the performance on other criteria cannot be ruled out. An assessment of the overall performance of the management will, therefore, necessitate some process of "averaging" of the performance on each of the different criteria. In case the performance on all these criteria is in the same direction, it would, of course, be possible to discern a general trend without any kind of averaging, but more precise and quantified result is not likely to be obtained without a process of averaging.

The weights to be attached to the different criteria for this kind of averaging would obviously have to be determined in the light of several factors including social and political forces, a discussion of which is beyond the scope of this paper.

While apparently, the approach outlined above is fairly logical and convincing, in operational terms it may not be easy to proceed along these lines. Often the management of the public enterprises actually operates under a complex of constraints conflicting with its commercial obligations, with-

out there being explicit directives from the investors, i.e., the government to that effect. The intentions and wishes of the government may enter into the decisions of the management of the enterprise surreptitiously, without any explicit directive or record thereof.<sup>2</sup> Although technically identifiable, in actual practice, the dividing line between the government and the public enterprise in respect of policy formulation tends to get blurred and indistinguishable. Policies actually originating at the government's level (i.e., the ministry concerned) may formally get expressed through a decision of the control board or the chief executive of the enterprise.

So long as such surreptitiously indicated government's directives and the policies resulting therefrom at the enterprise level do not come into conflict with the commercial obligations of the management, there is nothing to worry about. If, however, there is a conflict, the management will be not only actually working under constraints, but technically taking the full responsibility for a departure from the commercial principles of operation, even though as a matter of fact the responsibility for these constraints would lie on the government. Technically, these constraints would be non-existent and the management would be fully accountable for the entire structure and content of its policies. In this circumstance, appraisal of managerial performance on the basis of the above criteria might turn out to be unfair to the management, for, in the absence of externally given constraints the performance of the management would be judged on the basis of its achievement in furthering the commercial objectives of the enterprise. Thus apparently a strict application of the above criteria might well give a distorted picture of the performance of the management of the enterprise. The question is, does this fact of a certain degree of fusion of deci-

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2. Thus the government representatives on the control board of the enterprise may act as the carriers of the government's view and thereby mould the decisions of the board to suit the government's policies. Instances are not uncommon when the government's representatives on the control boards of public enterprises display a kind of dual loyalty and act more as representatives of government than as a member of the control board of the enterprise concerned.

sion-making process at the government level and at the level of the enterprise invalidate the scheme of priorities in the criteria suggested above for the evaluation of management's performance?

If we examine the question a little deeply, the answer would turn out to be in the negative. Logically, the assumption of responsibility for a decision should be inevitably associated with accountability for that decision, and the decision in question would not be excluded from the scope of evaluation. If the management has accepted or identified itself with a certain policy decision originating from the government, the responsibility for that decision must be borne by it and the validity or otherwise of that decision should be taken into account in evaluating its performance. Thus, the diffusion in the origins of managerial decisions need not distort the structure and content of the responsibilities with reference to which the performance of the management is to be judged. The implication of this reasoning is that the application of the structure of criteria for the appraisal of management's performance, would not in any way be unfair to the management.

### 3. The Problem of Appraisal

The criteria suggested for the appraisal of management's performance indicate the end results of the managerial function with reference to which the performance of the management is to be evaluated. Thereby, they provide a focus on the activities of the management on the basis of which the quality of the management's role in the enterprise has to be evaluated. Evaluation, however, involves a process of examination and scrutiny with reference to certain data regarding alternative possibilities. In the context of the performance of the management, data on the alternative possibilities may be obtained, in the main, from three sources: (1) the management's own performance in the past, (2) the performance of the management of other comparable organisations, and (3) some hypothetical standards of performance.

In case the basis for making the appraisal is (1) or (2)

above, the findings are likely to be entirely comparative in nature. In the first case the findings would throw light on the change in management's performance over time, in terms of improvement, deterioration or maintenance of stability. In the second case, the findings would reveal the comparative performance of the managements in different enterprises. In the third case, possibly, the findings may be such as to provide an answer to the question whether and to what extent the management of the enterprise is efficient. Often the evaluation in the comparative sense, as indicated above, may be the only feasible way of judging the performance of the management. But to a limited extent it may be possible to work out a method for evaluating management's performance with reference to historically known or technically known standards of perfection and thereby work out the quality of performance in absolute terms. With reference to any particular case, it may be worthwhile to examine the usefulness and feasibility of approaching the problem in all the three ways, for each of these approaches may provide useful guidelines for making improvements, which, needless to say, is the objective of evaluation of any kind.

Appraisal of the management's performance thus turns out to be an exercise in making a comparative evaluation, in the sense that the findings of an effort in this direction would depend upon the dimension of comparison chosen for the purpose. Thus, the management's performance in any year may appear to be quite good as compared to what it did in a previous year and quite bad as compared to what the management of a similar undertaking placed in similar circumstances is able to do. Generally, the possibilities in respect of making meaningful comparisons are likely to be too limited to allow for anything more than an assessment of change in performance over time.

Whatever be the dimension in which comparisons are sought to be made for the purpose, a good deal of caution would have to be observed in order to ensure that the comparisons made are meaningful and provide a sound basis for making a judgment. The danger of falling into the pitfalls of error and bias in this context may arise from two factors.

Firstly, the end results of the management's performance providing the criteria, in respect of which comparisons are to be made, may turn out to be conflicting with each other. Secondly, what are apparently comparable quantities may not as a matter of fact be comparable on account of incomparable environmental conditions.

As pointed out in section 2 above, the performance of the management in public enterprises has to be evaluated with reference to the achievement of the management in a number of directions. As such, there has to be a structure of criteria for the purpose. Since these criteria may be conflicting with each other, priorities have to be determined. By implication, an improvement in the performance of the management as reflected on one criterion may be inevitably associated with a deterioration in the same as reflected on another criterion. And there lies the danger of drawing wrong conclusions from comparisons of facts as they are, for while the management may appear to have been successful on one front, it may appear to have failed on another, although the latter may, as a matter of fact, be a consequence of the former.

The environmental conditions governing the performance of the management may relate to matters of policy as well as the physical and financial parameters under which the productive activity is organised. Any change or a difference in these conditions would obviously have an impact on the ability and the capacity of the management to discharge its functions and may thereby influence the end results which would thereby incorporate the effects of some such factors which are beyond the control of management. Evaluation of the performance of the management might thereby turn out to be somewhat erroneous and misleading.

Thus, in making the comparisons, the data in respect of the indicators constituting the criteria would have to be properly analysed in order to separate (1) the effects of management's achievements in one field on the same in other fields and (2) the effects of differences in the overall constraints under which the management functions on the end-results reflecting the management's performance. Given the

priorities, analysis of data on these lines would provide a basis for making a comparative evaluation of the achievements of the management in different fields and would, thereby, be of use in the assessment of the overall performance of the management.

#### 4. The Technique of Evaluation

While formulation of a suitable strategy is an important step in tackling any problem, it provides only a guideline for proceeding on the work. In the light of the strategy determined for the purpose, a detailed plan of action has to be prepared and the problems therein examined. The criteria for the evaluation of the management's performance, so to say, provide the strategy for undertaking the task. They indicate the aspects of the end results of management's performance which have to be taken into account for the purpose in view. They also suggest a certain scheme of priorities among these end results so as to enable and facilitate judgment insofar as there is a conflict between them. They, however, do not suggest in concrete terms the items and the quantities which have to be studied and analysed for the purpose. The strategy, suggested by these criteria, would have to be given a greater operational content in order to make it useful and applicable in specific cases. This would, in the first place, necessitate defining the end results constituting each of these criteria in greater detail. Secondly, it would require an elaboration of the techniques of comparisons implicit in the process of evaluation.

The main variables showing management's performance by first criterion, i.e., the extent of success achieved in realising the objectives of the enterprise—are likely to be the volume of output provided, the distribution of the product-mix and the investment of capital. Usually, these comprise the major end-results of the operation of the enterprise regarding which the government (i.e., the investor here) gives explicit instructions to the management of enterprise).<sup>3</sup>

3. These instructions may be conveyed in many ways. They may be conveyed directly to the enterprise by way of directives. Or,

(Continued on next page)

The main variable reflecting management's performance on the second criterion—the success achieved in maximising profits—is the rate of return on capital. The justification for relating profits to capital invested for the purpose in question lies in the fact that (1) capital is the most scarce factor of production and (2) there may be a direct functional relationship between the capital invested and the profits earned.

- The criterion in fact emphasizes profitability rather than profits as such.

The rate of return, however, is a ratio, showing the relationship between the net profits of the enterprise and the capital invested. It is a function of three other secondary variables, viz., aggregate revenue, aggregate cost and the aggregate capital invested, which may be significantly independent of each other. As such, each of these secondary variables would have to be studied separately with a view to analyse the management's performance in respect of profitability.

The variables indicating the quality of output are likely to differ a good deal from one enterprise to another, depending upon the nature of the output produced by the enterprise. At this place it is not possible to give anything more than a bare reference to what they might be. Thus, in the case of servicing enterprises (like electricity and transport undertakings), the punctuality and the regularity with which the services are provided may provide useful indicators of the quality of service rendered. In the case of manufacturing enterprises the main indicators of quality of output may be given by the degree of acceptability of the products of the enterprise by the consumers thereof. To a certain extent, an objective assessment of the quality of a commodity or service (or differences therein) is likely to be rather difficult, and judgment on this question would have to be based on what the consumers of the product in question feel about it. Indexes showing the direction and intensity of consumers' eval-

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they may be adopted as part of the plan objectives which in turn become the guidelines for the operation of the enterprise. A more subtle method may be through control over the budgets of the enterprise.

luation of the quality of the output of the enterprise may provide a supplementary set of variables with reference to this criterion. Broadly, the characteristics of the industry to which the enterprise belongs and the market situation governing the operation of the enterprise would determine the content and nature of the variables belonging to this category.

The variables showing the performance of the management in ensuring economy in resource use would have to be constructed in terms of ratios, as in the case of the second, i.e., the profitability criterion. These ratios would indicate the usage of each broad category of input per unit of output. Thus, the main indicators with reference to this criterion might be output per unit of labour, output per unit of capital invested, output per unit of fuel consumed, etc. The choice in regard to the inputs with which output is compared would be guided by the relative scarcity of the inputs in question, on the one hand, and the capacity of the input in question to represent the usage of productive resources in general.

The quantities which are sought to be related to each other by these variables may be expressed in terms of physical as well as financial units. Mostly, the quantities, relevant in the present context, are capable of being expressed in homogeneous physical units. Yet there may be some which do not have this attribute. In the latter case they would have to be converted into the homogeneous units of some other quantity which is fit to serve as a common denominator of the non-homogeneous units of the quantity in question. Usually, money serves the purpose of such a common denominator. Labour is one of the agents of production which is fairly homogeneous in character. But capital is not; and therefore has to be expressed in terms of money. Output may or may not be divisible into homogeneous units, depending upon the characteristics of the industry to which the enterprise belongs. As such output may be expressed in physical terms in case of some enterprises and in financial terms in the case of some others.

The implication of the above in the present context is that some of the variables falling into this class may be ex-

pressed in physical units and some in financial units. Generally, productivity of labour can be expressed in both physical and financial units. The same is true of productivity of capital, i.e., output per unit of capital, but usually it has to be expressed in financial units because of the difficulties in expressing capital in physical units. The necessity of expressing these indicators in terms of money is of some significance in the present context. The difficulty with money values is that direct comparisons between them may turn out to be somewhat misleading, on account of differences in the value of money itself. As such the variables expressed in financial terms may have to be processed in certain ways in order to make them useful for making comparisons.

There is one further point to be noted in this connection. The variables showing the management's success in effecting economy in the use of each agent of production separately may not necessarily provide a basis for a conclusive judgment on the overall performance of the management in this regard, taking all the agents of production together. Of course, if the results shown by each of these variables are identical in terms of direction, it may be possible to arrive at a broad conclusion on the question. But in case the trends shown by these indicators are not all in the same direction, it would be logically impossible to arrive at a general conclusion on the performance of the management in this regard, unless a method of averaging the results shown by each of these variables is evolved.

There are two ways in which this can be done. The first is by converting the different variables into a common unit of measurement which would obviously be money. The second is by constructing a system of weights which can be applied for averaging the pure quantities indicating the success of the management in effecting economy in the use of each agent of production. The use of the former method may ultimately reduce the criterion to that of money cost per unit of output. As for the second, comparative money costs would provide the only rational basis for constructing these weights, the application of which would inevitably take away the very essence of this criterion.

Usually, however, it would be possible to draw meaningful conclusions on the question referred to by this criterion on the basis of the variables relating to the individual agents of production. For, generally, the relevant comparisons, whatever be their dimension, are not likely to lead to such results which would make an attempt at the application of this criterion infructuous. Thus, in the context of comparisons over time, it is unlikely that the output-capital ratio and the output-labour ratio would turn out to be moving in different directions. Especially, if the period over which the comparisons are being made is short, the results in respect of changes in the variables, taken individually, are likely to be such as to indicate an identifiable trend to the usage of all the major inputs. Those of the variables which are not changing in step with the others are likely to remain stationary rather than move in a different direction. In case comparisons are being made between two undertakings, it is unlikely that they would be so very much different in respect of the technique of production, that the variables would show totally incongruous results. And if they really give such results, it would simply mean that the managements of the two enterprises in question are operating under basically different conditions as a result of which meaningful comparisons between their performance cannot be made.

The variables relevant to the different criteria would provide the bases for making the relevant comparisons for judging the performance of the management. But, as indicated above, these comparisons may turn out to be misleading. In order to guard against this danger, it would be necessary to process the data on these variables in a certain way and make necessary adjustments to ensure comparability for the purpose in view.

Broadly, the necessity for making such adjustments can be attributed to three factors. Firstly, the nature of constraints on the management's discretion in the situations in which management's performance is being compared, may not be alike. Thus, in the context of time series comparisons, the basic policies regarding production and distribution of output may not be alike in the periods in which the man-

ment's performance is being compared. The same sort of condition may be obtaining in the context of comparisons between the management's performance in different enterprises. The basic policies which the managements of the enterprises in question are expected to follow may be substantially different.

The differences of this nature may well account for a part of the differences in the values of the different variables relating to the various criteria for judging management's performance. Thus, if in period 1, the enterprise is expected to sell a part of its output at a price which is less than cost, and in period 2, there is no such obligation on the enterprise, the profits earned by the enterprise in period 1 may well fall short of that in period 2, for no lapse on the part of the management. Similarly, of two enterprises operating in the same industry, one may be required to produce a category of goods which it is uneconomical to produce, while there is no such obligation on the other. Obviously, comparison of management's performance in these two enterprises on the criterion of profitability may put the management of the first in a somewhat disadvantageous position.

In the interest of meaningful comparisons for the purpose, therefore, the nature and extent of the effects of the differences in the basic objectives of the enterprise on the values of the variables referring to the other criteria would have to be estimated. Obviously a substantial difference in these objectives may well account for significant difference in the rate of return on capital, the quality of the product as well as the usage of inputs per unit of output. The analysis would therefore be intended to separate the observed differences in the values of the variables concerned into two parts: one that is accounted for by the differences in the focus of the endeavour of the management, for which the management should not be held responsible explicitly, and the other that can be attributed to the differences in the ability of the management to husband the resources at its disposal.

Secondly, adjustments in the values of the variables in question may be necessitated by differences in the environmental conditions governing the situations under which the

management's performance is being compared. These objective conditions may comprise such factors as the prices of inputs and outputs, technical co-efficients of production and the complex of restrictions put on the management by the government on matters relating to the organisation of productive activity. Here again the purpose of the analysis would be the same as in the previous case, viz., to separate the observed differences in the variables in question into two parts: (1) that attributable to factors within the control of management, and (2) that accounted for by factors beyond the control of the management.

Lastly, it may be necessary to make some adjustments in the values of the variables for assessing the implications of the interactions between the different criteria. As pointed out above a superior performance of the management on one criterion may implicate an inferior performance on another criterion. Obviously, therefore, in all such cases the values of the variables relating to each criterion would have to be analysed in order to assess the extent to which the difference in their values is accounted for by the difference in the performance of the management on all other criteria which find a higher place in the priority list of the criteria for the purpose. Otherwise, a superior performance of the management on one criterion may well prejudice its evaluation on another criterion.

### 5. Appraisal for Corrective Measures

The analysis of the values of the variables would indicate the performance of the management on different fronts. The purpose of appraisal, however, is not merely to make an assessment of what the management has done or is doing, but also to suggest guidelines for improving the same. The variables relating to the different criteria would have to be subjected to some further processing if the factors responsible for the differences in the management's performance are to be investigated.

A full-fledged endeavour in this direction would inevitably necessitate a detailed break-down of all the relevant variables into a number of secondary variables showing the extent

to which the observed differences between the values of these variables in comparable situations can be attributed to the different factors. This kind of detailed breakdown would have to be made for each enterprise individually, keeping in view the complex of the inputs and outputs of the enterprise in question. It would, therefore, be difficult to make any generalisation in this regard; yet an attempt can be made in this direction.

Logically, an analysis of the contribution of different factors to the observed difference in the realised rate of return on capital should explain the differences in performance of the management on each of the four criteria. Taking the example of time series comparisons, a change in the input-output ratios, or a change in the quality of the product over time are likely to have an effect on some of the secondary variables determining the rate of return on capital. Similarly the variable showing changes, if any, in the basic policy matters relating to the content and distribution of output are also likely to have an impact on some variable or other determining the rate of return on capital. Thus, detailed analysis of a change in the rate of return over time showing the contribution of different factors to the same may well go a long way towards indicating the performance of the management on each criterion.

The first step towards the kind of analysis of the rate of return on capital would be to explore the main factors which bear on each of the secondary variables determining the rate of return on capital. The size of aggregate revenue of an enterprise during any period would depend upon three factors, viz., (a) the size of output, (b) the proportion of output which is actually sold during the period, and (c) the price per unit of output. The size of output in turn would depend upon two factors, viz., the extent of utilisation of the capital invested in the enterprise and the size of investment itself. Aggregate cost may be divided into two parts, viz., (i) running cost and (2) overheads. The former would depend upon four factors, viz., (1) the size of capital invested, (2) the running cost per unit of output produced, (3) the intensity of utilisation of capital, and (4) the price of inputs.

Further, the capital invested itself may be divided into two parts: (1) fixed capital, and (2) working capital. Comparisons between ratios representing the relationships between some of these factors may well provide a useful basis for discerning the reasons for the observed difference in the rate of return in the situations being studied. For instance, the relevant ratios for the purpose on the revenue side may be output|capital (in physical and financial units), output|fixed capital, output|working capital, revenue|output, and output sold|output produced. With reference to cost the relevant ratios may be overhead cost|capital invested, overhead cost|fixed capital, overhead cost|working capital, running cost|capital invested, and running cost (financial units|running cost (physical units)). In respect of capital, some of the useful ratios may be interest cost|capital invested, depreciation cost|capital invested, and fixed capital|working capital.

While providing useful bases for analysis, the ratios by themselves would not give an exact explanation of the causal relationships. That is true of every statistical analysis. A statistical analysis has to be supported by logical reasoning in order to enable it to give dependable and precise explanation of the phenomenon being studied.

## 6. Some Administrative Implications

There are two aspects of the task of appraisal of the management's performance, one is positive and the other is prescriptive. The positive aspect is concerned with fact finding and assessment. Efforts in this direction should cover both these dimensions of the problems.

Further, the task should be undertaken at the level of the enterprise as well as by an agency outside the enterprise. Appraisal at the level of the enterprise would be intended to keep the management continuously informed about the quality of its performance. Appraisal by the external agency would serve the dual purpose of providing the management with an objective assessment of its working and ensuring the accountability of the enterprise to the parliament and the public.

Most public enterprises do have some kind of statistical units, but their work is largely confined to preparation of Annual Reports, which seldom give anything more than the summary of audited accounts. In larger enterprises, the statistical units are entrusted with the task of feeding the management with statistical material on performance, but the purpose behind this is to collect information on the performance of subordinate levels in the managerial structure. The internal audit departments, in the few enterprises in which they exist at present, are not even remotely concerned with a task of this nature. Their main preoccupation is to help the management in observing the juridical propriety in making financial sanctions.

The absence of an adequate organisational machinery for undertaking the task within the enterprise may be partly attributed to the sheer inability of the enterprises to do so. The reasons for this may, in turn, be the lack of trained staff and lack of management consultancy services. In order to fill up the lacunae in these respects, it might be useful to set up an adequately equipped management cell in the Bureau of Public Enterprises, which would provide necessary services to the enterprises including that of training of manpower.

The setting up of proper internal organisation may, however, will take some time. In the absence of it, it is unlikely that the public enterprises would be able to undertake an appraisal following the rather sophisticated method suggested above. In the meanwhile, the enterprises may well work out simpler methods comprised of some relevant ratios of the main variables to assess their performance. As a matter of fact, in the present circumstances, they may well have to adopt a phased programme incorporating a gradual introduction of a system of appraisal of performance as suggested above.

As regards appraisal by an external agency, the main organisations directly concerned with this task at present are the Parliamentary Committee on Public Undertakings, the Bureau of Public Enterprises and the Comptroller and Auditor-General of India. The type of focus that would be needed for making an assessment on the lines suggested above is

entirely absent in the approaches of the existing agencies undertaking the task of evaluation of the working of public enterprises. The examination of the working of public enterprises by the Parliamentary Committee on Public Undertakings is largely concerned with matters of detail, which while undoubtedly having a bearing on the overall quality of management's performance, do not present an overall picture of the same. The work of the Bureau is largely descriptive. In its report it does give some kind of analysis of the financial and working results of these enterprises, but it is difficult to discern an inherent purpose behind it. The C. & A. G.'s report again suffers from the same defect as the report of the Parliamentary Committee on Public Undertakings. It concentrates on minor points.

It might perhaps be possible to entrust any one of the existing agencies with the task of making an appraisal on the lines suggested above. The Parliamentary Committee on Public Undertakings is undoubtedly the most powerful and the most respected organisation available for the purpose. But it suffers from one great handicap insofar as its suitability for undertaking a task of the type in question is concerned. As a matter of convention, it does not take expert assistance in discharging its functions, which may limit its capacity for a sophisticated type of analysis. Further, the Committee is usually not in the habit of making a distinction between the government and the management of the enterprise, which is the very basis of the methodology proposed here. The Comptroller and Auditor-General could be a competent agency, but it is doubtful whether it would be desirable to dilute its present auditing functions with the function of appraisal of performance in general, which obviously involves a different type of approach and analysis. Besides, a common difficulty with both these organisations is that it would be difficult for them to cover the large and increasing number of enterprises in the public sector in India.

The Bureau of Public Enterprises is a small organisation at present, but it has immense potentiality of developing into a servicing agency for public enterprises. With an expansion of the facilities at its disposal, it may be possible for it to

undertake a task of the type and order envisaged here. Three points may be advanced in favour of entrusting this task to the Bureau. Firstly, the Bureau being a part of the Government can evaluate as well as advise the public enterprises on such organisational matters as setting up an internal organisation for appraisal. Secondly, it can obtain the necessary expert assistance and advice for the purpose. Thirdly, it can undertake the task on a fairly substantial scale.

Whatever be the external agencies concerned with this task, it would be necessary to organise them on such lines which enables them to avail the best of expertise available for the purpose. To this end, they should have both part-time and full-time staff drawn from various professions, e.g., administration, engineering, business and also the academic profession. Similarly the internal units within the enterprise should be staffed with specialists of a fairly senior level belonging to these professions. Here again, in order to attract the best of talent, provision may be made for both full-time and part-time members.

# APPRAISAL OF THE MANAGEMENT'S PERFORMANCE IN PUBLIC ENTERPRISES

## ( PART II )

The preceding paper was devoted to a general discussion of the problem on a theoretical and methodological plane. In this article an attempt is made to suggest a few criteria for the same with reference to some selected public undertakings. A few operational difficulties arising in this context are discussed in some detail. Illustrations are drawn in particular from the Fertiliser Corporation of India, the Hindustan Insecticides Ltd., the Heavy Engineering Corporation, and the Bihar Road Transport Corporation. The first three of the above are manufacturing enterprises, while the fourth may be categorised as a public utility undertaking.

### 1. The Dimensions of Appraisal

The task of appraisal would be rendered fairly easy if the Government took care to define the objectives of management with a fair degree of detail and precision. Thus the management may be provided with a plan of operations giving the quantity, quality and structure of the output-mix, the prices at which the outputs are to be sold, the cost of production and the input productivities to be attained, in a given accounting period, say, a year. The plan would thereby provide the basic norms with which the realised results of the enterprise could be compared. Of course, such comparisons may turn out to be misleading in case the objective conditions on which the plan targets are based are not realised. Assuming, however, that in setting the targets adequate care is taken

of expected changes in objective conditions the adjustments in the data needed for making meaningful comparisons are not likely to be very extensive.

In case the goals which the management has to pursue are multiple and diversified, an overall assessment would necessitate laying down priorities among the same. If the plan itself lays down the priorities, the scope for ambiguities in the final judgment would be considerably reduced. In case, it does not, some kind of ordering of criteria would have to be made taking into account the management's viewpoint as well.

In India, public enterprises have been allowed considerable measure of autonomy in their operation. The autonomous undertakings of the company or corporation type prepare their own plan of operation. The explicit control of the Government is generally limited to decisions relating to investment and pricing of products. All public undertakings have an explicit obligation to submit their capital budgets to the Government for approval. This, of course, is quite natural in the present context when, except in a few cases, like the Hindustan Machine Tools, new investments in the public enterprise sector are still financed by the Government in a major way. As regards pricing, the electricity and transport undertakings have to obtain the explicit permission of the Government for introducing a change in their prices. The same kind of restriction obtains in the case of several other enterprises like the Hindustan Antibiotics,<sup>4</sup> the Fertiliser Corporation of India<sup>5</sup> and the Hindustan Machine Tools. Many enterprises, however, are free to fix their prices on the principle of what the traffic will bear.<sup>6</sup>

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4. The Government exercises control over the prices of the company under the Drugs Prices (Display and Control) Order, 1966.

5. The prices of the F.C.I. are fixed on the recommendations of the Tariff Commission. Steps are, however, being contemplated for introducing free sale of certain parts of the output of the Corporation.

6. Some examples of such enterprises are provided by the Indian Rare Earths Ltd., and the Central Road Transport Corporation.

By and large, public enterprises are seldom under any obligation in respect of the output to be produced. Most enterprises do, no doubt, determine the output targets for each accounting period, but this is not based on any explicit directive from the Government. It is determined by the management itself on the basis of the past performance, and an assessment of the technical potentialities of the enterprise. Similarly the Government seldom prescribes any target in regard to input productivities to be achieved by the management. A few enterprises like the Chittaranjan Locomotive Factory, the Indian Drugs and Pharmaceuticals Limited and the Hindustan Steel Limited do some exercise in this direction, but this is again based on the management's own assessment of the situation.

To a certain extent, the plans prepared by the management and the targets incorporated therein can be used as a kind of norm for making the necessary comparisons. However, an obvious danger underlies this which is that the targets may underestimate the potentialities of the enterprise in the different directions. Even if the management is not motivated in its approach, the estimates that it makes may not be realistic for the simple reason that the techniques used by it may not be fairly sophisticated. Few enterprises make sufficiently detailed estimates of demand and cost behaviour which would enable them to set realistic targets relating to their performance. In the Bihar Road Transport Corporation, for example, estimates of demand for the services offered are mainly based on past performance, without making adequate allowance for the special factors bearing on it. The same is true of the financial estimates relating to cost made by this undertaking. Some enterprises are not in a position to make realistic estimates simply because the conditions of uncertainty in which they operate makes it difficult for them to achieve anything more than a very rough forecast of the likely trends in demand and costs. The Heavy Engineering Corporation, for instance, has not been in a position to project its revenues and costs for more than two years in advance of the current year on account of lack of firm orders.

"On the whole, public enterprises in India are not bound

by rigid plan of operations. Within the framework of the statutory provisions (as in the case of public corporations) and the Articles of Association (as in case of company-type organisations) they have a considerable measure of autonomy and freedom of action. This leaves them a wide range of choice for setting up proper criteria for the assessment of the performance of the management. The norms for comparing the realised results could be selected either from the past results of the enterprise in question, or the performance of other enterprises operating under comparable conditions or from the technical data relating to the plants. The range of comparisons (and the limitations thereof) that could be made with reference to each of the criteria developed in the previous paper are discussed in the following sections.

## 2. Performance in Respect of Output and Investment

In a static context, when the size of investment in the enterprise is given, data relating to past performance in regard to the size of output produced may serve as a useful norm for making comparisons for the purpose in view. In case, however, the enterprise is expanding, such comparisons may turn out to be misleading.

The greater the degree of divisibility of capital, the more complicated the problem is likely to be. Thus, in the case of a road transport undertaking new buses may be added to the existing fleet every year, thereby increasing the extent of services provided in each year as compared to the previous year. In those industries in which the gestation period is fairly long, additional output from new investment would not, generally, be forthcoming every year. In the case of a steel plant, for example, expansion in capacity would normally occur by jerks, say at the interval of 5 to 10 years.

The difficulties emanating from this factor can be obviated by making selective and partial rather than aggregative comparisons. In the case of the Fertiliser Corporation of India, for instance, comparisons can be made between the outputs of each of the plants, e.g., ammonium sulphate plant—old and new—(Sindri), coke-oven plant (Sindri) and C.A.N.

plant (Nangal) separately in successive periods. Similarly in the case of the Bihar Road Transport Corporation, comparison can be made between services provided by a given fleet of buses in successive periods. The average mileage given by each vehicle can also be used for the purpose after making proper adjustments for the special factors bearing on it, e.g., change in the proportion between long distance and short distance services in the periods in question.

The usefulness of comparisons in the other dimension, between realised and normative outputs would depend a great deal upon the way the norms are selected. One way of selecting the norms would be to refer to the project reports which give a technical estimate of the productive capacity of the plants. The most important difficulty in using the norms given by technicians is that the parameters on which they are based may be non-existent in reality. A good example of this is provided by fertiliser production. The attainment of the rated capacity of the ammonium sulphate plant in Sindri is dependent upon the availability of raw materials like coal and gypsum of certain standard varieties. During the last several years, however, the Corporation has been facing acute difficulties in procuring the raw materials of the requisite standards, resulting in fall in production. Further, in many cases, the facilities for maintenance of plants available here are not comparable to the same in countries in which they are designed. In view of these difficulties, it would be more appropriate to make fresh estimates of the technical production capacity taking into account the relevant factors including the designer's estimates, for purposes of making the relevant comparisons. Several public enterprises including the FCI have taken steps in this direction by estimating what they call as 'attainable' capacity as distinguished from 'rated' capacity.

The scope of making inter-enterprise comparisons of output for the purpose in view is indeed very limited for several reasons, e.g., (i) the absence of comparable undertakings, (ii) technological differences, and (iii) difference in the objective conditions of operation. In the case of public utilities, like electricity and transport, comparability of aggregate output is virtually non-existent. Comparisons may, however, be made

in respect of output in specific areas of operation or specific sectors. For instance, it may be useful to compare the electricity generated in thermal plants of equal size in two electricity undertakings. Similarly, the output of certain workshops in transport undertakings engaged in making the bodies of buses can be compared purposively. On the whole, however, inter-enterprise comparisons between aggregate outputs in physical terms are not likely to be of much significance.

Not many public undertakings in India have an explicit directive from the Government in respect of distribution of output. Some enterprises like the Bharat Electronics Limited and the Hindustan Aircraft Limited, of course, cater to the requirements of the Ministry of Defence. The Fertiliser Corporation is still under the explicit obligation to sell a major part of its output to the Government. Another example is that of the Hindustan Insecticides Limited which is under an explicit obligation to sell a major part of its output to the Government. In all cases in which such obligations exist, the directive of the Government in this regard provides an explicit norm for judging the performance of the enterprise in this regard. The actual performance of the Hindustan Insecticides, for example, in respect of the distribution of its output may then be judged in relation to specific obligations placed upon it by the Government. Since, however, normally, the public enterprises give priority to the Government in the supply of their products, such comparisons are unlikely to throw an unfavourable light on the performance of the management.

### 3. Financial Performance

The first problem that arises in this context is that of making adjustments in the financial results for variations in constraints in regard to both production and distribution targets. The process by which this would be made is bound to be rather complicated. A very good illustration of change in constraints is provided by the obligation imposed on the electricity undertakings to supply power to rural areas at

rates below cost.<sup>7</sup> The financial implications of this kind of obligation can be worked out by separating the costs and revenues associated with the constraints from the aggregate costs and revenues, in the given accounting period. Thus in the context of time series comparisons the additional cost and additional revenues resulting from rural electrification can be deducted from total revenue and total cost in order to make the financial results of the year in question comparable to the same relating to those years in which there was no such obligation. Similar adjustments for purposes of comparisons can be made in the financial results of a road transport undertaking which is required to provide services on uneconomic routes. The Bihar Road Transport Corporation has been under an explicit obligation to provide a state-wide network of transport services, even though the service provided on many of the routes is unremunerative. In order to make the comparisons in view, the uneconomic services provided under the compulsive obligations may be separated from the rest.

Apart from the constraints on production and distribution there are constraints on the financial policies of the enterprise which usually bear upon pricing and procurement of capital. A few illustrations regarding government's control over pricing in these enterprises have already been given in Section I above. Government's control over the capital structure of the public enterprises is on the whole much more widespread than that over pricing. By and large, the management of public enterprises has very little discretion to exercise in the matter of capital structure. The equity-loan ratio, as well as the terms of loans are determined by the Government and are subject to change from time to time. In the case of the Bharat Electronics Limited, for example, the ratio of long term loan to total capitalisation increased from 4 per cent in 1961-62 to 31 per cent in 1964-65. Alongwith it, the amount of interest paid by the undertaking increased from 1.8 lakh in 1961-62 to 9.8 lakhs in 1964-65. To take another illustration, in the case of the Praga Tools Corporation Limit-

7. In the initial stages, rural electrification turns out to financially a loss as it takes some time before the load becomes sufficient to pay off the total cost of supply.

ed the ratio of long-term loan to total capitalisation increased from 12 per cent in 1961-62 to 35 per cent in 1964-65; while the interest paid by the undertaking increased from Rs. 10,000 to Rs. 5.5 lakhs during the same period.

The adjustments needed for making allowance for changes in these constraints are unlikely to give rise to complicated statistical problems. The effect of a price change on the revenue accruing to the enterprise can, for instance, be estimated by deflating the figures of revenue receipts by the index of price-change prepared for the purpose. But the problems arising from the change in other objective conditions beyond the control of the management, e.g., input prices and qualities are likely to be more formidable, insofar as the end results registering the effects of these factors may be identical. To take the case of fertilisers, a precise differentiation between the effects of a change in the quality of raw materials like coal and gypsum and that of inadequate maintenance of plants would be difficult to achieve; as both lead to the same effect, viz., fall in production. Unless there are technically given functions showing the relationship between inputs of different qualities and outputs, it would not be possible to make anything more than a rough approximation of the separate effects of the two sets of factors. Time and again such exercises have been undertaken by the Chief Cost Accounts Officer at the request of the Government in order to provide a basis for price fixation.<sup>8</sup> In the case of transport undertakings, variations in such objective conditions are generally in the direction of differences in load factor resulting, in turn, from differences in demand conditions, and differences

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8. The Chief Cost Accounts Officer of the Ministry of Finance examined the costs of the Sindri Factory for 1958-59 and worked out the fair ex-works cost of ammonium sulphate produced by the factory during 1958-59. The Tariff Commission fixed the fair price of ammonium sulphate for that year on the basis of the findings of the Chief Cost Accounts Officer. More recently, in December, 1963 the Chief Cost Accounts Officer was asked to undertake an overall costing of Sindri and Nangal factories, and estimate the likely costs for 1964-65. The CCAO's reports on Sindri and Nangal factories were submitted to the authorities concerned in March and April, 1964 respectively.

in the distribution of services between urban and rural, which bears upon the cost of service provided. Here again it would be rather difficult to make the necessary adjustments in the realised revenues and costs for purposes of comparisons. The task would be one of exploring the comparable areas of operation and estimating the costs and revenues thereon.

The usefulness of inter-enterprise comparisons of profitability in terms of rate of return on capital is subject to the same limitations as inter-temporal comparisons in respect of a given enterprise. Differences in constraints over the operations of different enterprises would have the same implications for the purpose in view as changes in constraints over time in the case of a given enterprise. And, therefore, in all those cases in which such constraints exist, the same kind of adjustments would have to be made as for changes in constraints in the case of inter-temporal comparisons. Similarly apart from overall comparisons, there may be a good deal of scope for partial comparisons between the financial results of specific areas of operation in different enterprises. Thus comparisons between the profitability of coal mines of identical characteristics in respect of depth, etc., may throw valuable light on the comparative efficiency of the managements of the units in question. In this particular industry, there is a further possibility of meaningful comparisons between the publicly owned and privately owned units.

Notwithstanding its limitations, the scope for making inter-unit and inter-enterprise comparisons in the public sector is much more extensive than what is generally thought of. The commercial sector, comprising the distributive agencies like the super-bazars, provides an excellent scope for inter-enterprise comparisons for the purpose in view. Meaningful comparisons can be made between the profitability of different units of state demonstration farms and poultry farms as well. The Khadi and Gramodyog units in different states also generally satisfy the conditions for a purposive use of this technique, since the constraints under which they operate are by and large confined to subsidies and tax-concessions.

The other alternative, that of comparing actual performance with a prior set standard throws up many very useful possibilities. The financial prospects of the enterprise can be estimated ex-ante in terms of a budget and a break-even chart. The budget may be framed on performance-cum-business lines showing the details of revenues with reference to each item of the product-mix. Similarly, the details of cost may be prepared product-wise, showing at the same time, the break-up of the same between its different constituents, e.g., overheads and works cost. With a view to making an assessment of the kind under reference, estimates of costs may be made with reference to certain norms relating to performance on the one hand and the special factors bearing upon cost behaviour which are beyond the control of the management, on the other. A comparison between the estimated and realised results both in regard to revenues and costs would provide a basis for judging the performance of the management on the question of financial performance, although here again adjustments would have to be made for the interplay of unforeseen factors beyond the control of the management.

The estimates prepared in this connection, may be consolidated in the form of a break-even chart showing the profitability of the enterprise at different levels of capacity-utilisation. The break-even chart shows in a summary form the behaviour of costs and revenues in response to variations in the output of each commodity. The major advantage of a break-even chart is that it focuses attention on the financial results of the operation of the enterprise and provides an instrument for a continuous check on the factors bearing on it.

To take an illustration, a cost and revenue estimate and a break-even chart in the case of the Bihar Road Transport Corporation can be prepared in the following manner. The services provided by the Corporation can be put into two categories according to the fare charged for the same. The cost in respect of each category of services can be classified as (i) fixed charges comprising (a) depreciation on assets (mainly buses here), (b) interest, and (c) share in cost of head-office, and workshop, and (ii) variable charges compris-

ing (a) cost of fuel, (b) cost of labour, and (c) expenditure on maintenance.

For any given year, the fixed expenses on each category of service can be plotted to show the size of expenses at different levels of output. Alongwith it an estimate can be made of the revenue accruing to the Corporation at different levels of services provided, on the assumption of a given load factor. In case, the load factor is somewhat unpredictable, in the sense that there is a likelihood of substantial variations in it, two or three separate estimates can be made on the basis of different assumptions regarding the load-factor. The point of intersection between the revenue curve and the total expenses curve will give the level of output at which the Corporation will be just covering its costs with its revenues.

The results of the operation of the enterprise can also be plotted in terms of a break-even chart in the same way. A comparison between the ex-ante and post-facto break-even charts will provide a summary resume of the factors bearing on the profitability of the enterprise. With reference to a road transport undertaking, the excess of realised profits over the budget estimates will be reflected either in a shift in the revenue curve or a shift in the expenses curve. If the realised load factor turns out to be more than the budgeted estimates, the revenue curve will shift leftward. In case the realised costs are lower than the budget estimates for the same, the total expense curve will shift downward. In either case the break-even point will move leftward.

If the price level is fixed for the accounting period in question, as is likely to be the case in most public enterprises, the break-even analysis will show the extent of success achieved by the management in effecting economy in cost over the budgeted estimates. It would not, however, indicate the extent to which changes in costs are accounted for by factors within the control of the management and factors outside the control of the management. In order to make an assessment of this type it would be necessary to make a further analysis of input-efficiencies in the enterprise.

#### 4. The Quality Criterion

As pointed out in the previous paper, the general measure of quality of output is provided by its acceptability by consumers. The precise indices of the same would, however, differ from industry to industry depending upon a multiplicity of technological and other factors.

In some cases changes in quality have a direct bearing on the financial results of the enterprise, in others they bear upon the convenience of the consuming public only. In the case of public utilities like passenger road transport and electricity supply, the financial implications of variations in quality may not be very significant. On the other hand, in the engineering industry quality variations may be reflected in enormous variations in financial results. An important task associated with the application of this criterion is the estimation of the financial implications of the management's performance in this regard.

Two main types of factors are likely to bear upon the quality of output produced. In the first place, the objective of producing a certain category of output may implicitly lower the average quality of the aggregate output. Secondly, a fall in the availability of raw materials of requisite quality may affect the quality of output adversely. In the familiar case of road transport undertakings, the obligation to provide services to certain rural areas may well affect some such indicators of quality of services provided as "average number of accidents per lakh of bus-miles", and "average number of break-downs per 10,000 miles". Similarly, the non-availability of spare parts may well influence these indices. Accidental factors such as communal disturbances and students' unrest may further contribute to the effects of the above factors. In the case of manufacturing enterprises, the major limitations in this respect are likely to arise from variations in the quality of inputs. One of the best examples of this is provided by the railways which had faced a lot of difficulty in providing adequate and timely services during the later part of the Second Plan period on account of paucity of coal.

Notwithstanding the limitations arising out of the above factors, there will be considerable scope for the application of aggregative measures of quality of performance if the overall effect of the factors in question is marginal in character, as it is likely to be in most cases.

Further, selective comparisons can always be made in this regard with a view to making the necessary assessments. Thus in the case of road transport undertaking, time-series data in respect of the indices of quality of performance can be collected with reference to individual routes and comparisons can be made between the aggregates relating to comparable areas of operation.

Inter-enterprise or inter-unit comparisons are subject to the same type of limitations as inter-temporal comparisons. The major areas in the public enterprise sector in which such comparisons can be made are rather limited. This is primarily on account of the lack of competing enterprises in those cases in which the output is homogenous and because of specificity of output in other cases. In a few cases including the Hindustan Antibiotics, and the Bharat Electronics, a part of the output of the enterprise is homogenous and standardised and is sold in competitive markets thereby permitting quality comparisons in a limited way.<sup>9</sup>

The other dimension of comparison, that between the actuals and some standard norms of performance, would necessitate building up of some quality-standards. In the case of electricity supply for instance norms may be laid down in regard to voltage of power supply. Alongwith it, the number of permissible breakdowns can also be predetermined. The extent to which purposeful standards can be laid down in the case of manufacturing enterprises would depend upon the homogeneity and technical characteristics of the output. In the case of homogeneous output, a common standard of quality specifying the technical properties of the product can

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9. The Hindustan Antibiotic's major product is penicillin while that of the Bharat Electronics is valves.

be laid down for the entire output level. Thus in the case of the Fertiliser Corporation of India, the quality norms of the fertilisers produced can be laid down in terms of their nitrogen content. If, however, the output is made to order, i.e., to meet the specific requirements of the customers, the standards of quality will have to be determined for each product specially. This for instance, is likely to be so in the case of most of the outputs of the Heavy Engineering Corporation. The HEC largely caters to the needs of the steel industry and the job orders are such as to take a long time to complete. Further, in the case of many items, the actual quality of the equipment can be tested only after they are installed in the plant in question. In this circumstance, it will be difficult to judge the quality of the product on the basis of an ex-ante standard of technical perfection.

### 5. Comparisons of Input Productivities

As was indicated earlier in Section 2 above, comparisons of input productivities may be used as a supplement to the analysis of financial results. The basic purpose of this kind of analysis is to show the efficiency of the management in ensuring economy in the use of resources. The analysis of this can be made in aggregative terms for the enterprise as a suring economy in the use of resources. The analysis of this enterprise. As in the case of the other criteria, the latter would be necessitated to allow for the effects of constraints.

Measurement of input-productivities throws up rather complicated problems of measurement of inputs and outputs. If the output of the enterprise is homogenous, simple ratios can be built up for the purpose. A case in point is again that of passenger road transport. Some relevant ratios for a road transport undertaking would be (1) value of services provided|actual capital invested, (2) bus-miles|total capital invested, (3) bus-miles|total labour employed, (4) bus-miles|total fuel consumed, (5) expenditure on maintenance|number of buses, (6) aggregate working capital|number of buses,

and (7) aggregate stores|number of buses. A few other ratios indicating the factors underlying changes, if any, in the above may be the following: (i) number of absentees|total work force, (ii) turnover of buses in workshops|current expenses in workshops, (iii) number of breakages and accidents|aggregate bus-miles. If, however, the output is not homogenous as is true of enterprises like the Heavy Engineering Corporation and the Mazagon Docks Limited, the task of building up ratios for the purpose will be somewhat more complicated. Output, in such cases, will be measurable only in value terms, and in the context of changing input prices, inter-temporal comparisons between productivity of capital over time may well turn out to be misleading. The same would be true of comparisons of labour-productivity. Deflating input prices may not be of much help in this context since the input components of different products are not likely to be identical. A further difficulty may arise in the case of such enterprises from the fact of relatively long time taken in finishing the job orders. A blast furnace manufactured by the Heavy Engineering Corporation, takes about three years to complete. Similarly, a ship manufactured by the Hindustan Shipyard may be completed in two to three years. An important implication of this in the present context is that the value of output produced in the accounting period of one year will cease to be an unambiguous and unique magnitude. In the absence of a value measure, the only measure left would be that given by the cost of inputs. The use of money costs as a measure of output will make the ratio tautological in character.

In most cases in which output is not homogenous, it may be more useful to compare the structure of costs rather than input productivities. The structure of costs would show the input-combinations needed to produce a given product. Thus the cost structure of a blast furnace manufactured by the Heavy Engineering Corporation can be compared with the cost structure of the same produced in Czechoslovakia. The same would apply to a number of its other products like mining equipment, coke oven and by-product equipment, and rolling mill equipment which are not being produced in India.

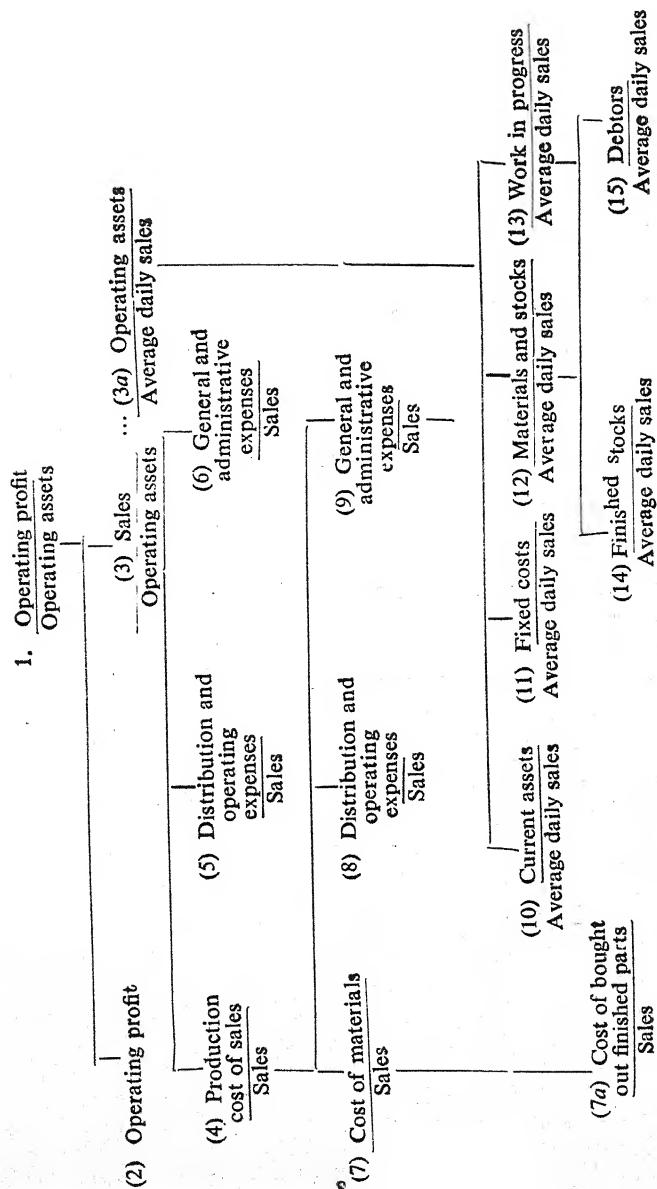
A comparison of this kind may throw useful light on the technical as well as organisational deficiencies of the production process.

The extent to which meaningful comparisons can be made in respect of different inputs would depend upon (1) the technical characteristics of production, and (2) the extent of homogeneity in the inputs. The existence of joint costs is invariably a hurdle in the way of measurement of productivity of at least one important input, viz., capital. Economic science has not so far been able to solve the problem of allocation of joint costs between different products with a sense of finality. Emergence of by-products may also give rise to problems of a similar kind. To take an example, the Hindustan Insecticides Limited is producing a number of by-products including hydrochloric acid and sulphuric acid. The sales value of the by-products have been increasing since 1956-57. This may however, be somewhat misleading insofar as, to a certain extent, the increase in sales values of by-products was by reason of an increased effort on the part of the management to utilise the waste material and an expansion in the market for the same. In this particular case, increase in productivity need not indicate an increase in the efficiency-in-use of capital. If, however, output is measured entirely in terms of technical DDT, which is the main product of the HIL, productivity of capital will indicate the efficiency-in-use of capital as well.

The financial implications of variations in input efficiencies can be assessed by constructing a "pyramid of ratios" for successive accounting periods in the context of time series comparisons and for different enterprises or units if the objective is to make inter-enterprise comparisons. In making inter-temporal comparisons, care would, of course, have to be taken to make adequate allowance for price-changes. A structure of ratios used by British management consultants is given on page 41.

One great merit of the above structure of pyramids is that it accounts for variations in costs and profit per unit of

### Pyramid of Ratios



the commodity and service sold as well as the rate of return on capital. A variation in the availability of inputs would, for instance, be reflected in the ratio, cost of materials:sales. The ratios (10) to (15) would show the effectiveness with which capital is utilised.

Comparisons in terms of pyramid of ratios would be more useful in the case of manufacturing enterprises than public utilities and distributive and promotional kind of enterprises. The reasons for the fall in the surpluses made by the Sindri Fertiliser Factory from 1962-63 to 1966-67 on account of fall in production, a rise in input prices and a decline in input qualities can be easily discussed by way of changes in the relevant ratios.

The third alternative, that of comparisons with normative standards may be of considerable value insofar as this criterion is concerned. The possibilities in regard to setting standards of input productivities are quite extensive in almost every industry in which public enterprises have been set up. To take a few examples, standards of input efficiencies can be effectively set up in the case of Hindustan Insecticides, Fertiliser Corporation of India and the National Coal Development Corporation. In the case of Hindustan Insecticides, the standards can be laid down specifying the consumption of its major inputs comprising alcohol, benzene, chlorine and oilum, per metric ton of D.D.T. produced. As for fertilisers, ratios may be constructed showing the requirement of coke and gypsum per ton of ammonium sulphate produced. Similarly, ratios may be built up showing the consumption of electricity and limestone per ton of CAN produced (at Nangal). In the case of passenger road transport, the relevant ratios would be mileage per litre of diesel, petrol, and lubricants. Here it may be more purposive to construct the standards for different routes individually and for different categories of buses, rather than for the enterprise as a whole.

Standards can be built for a job-order type of an enterprise as well. Lack of homogeneity and specificity of output would, however, necessitate building up of standards with ref-

erence to each unit of output separately. Thus in the context of the Heavy Engineering Corporation, norms of input-usages can be determined for every item produced such as rolling mills equipment, blast furnace, and crane equipments. These norms would, however, be of the kind of best possible estimates drawn on the basis of the basic technical functions, since there would not be much of past experience to draw on. Indeed, an important factor preventing the Heavy Engineering Corporation from laying down such standards has been lack of experience in handling similar tasks.

In order to facilitate comparability (as also to provide a mechanism for a continuous check on the operations of the enterprise) the standards can be built up into the production and cost budget of the enterprise. In preparing the budgets many of the constraints and the limitations that the management is subject to can be taken into account. Thus it may be possible to anticipate the effects of non-availability of raw materials of the requisite quality on factor productivities to a considerable extent and make allowance for it in the cost budget of the enterprise. Changes in constraints are usually known insofar as they relate to basic policy matters. At present, however, few enterprises make the necessary exercises for the purpose, and their budgeting is largely based on the past results of the working of the enterprise.

The study of input efficiencies may be supplemented by a further analysis of some of the basic factors bearing on the same. These are, in the main, (1) availability of right type of raw materials, (2) adequate maintenance of plant and equipment, and (3) labour relations. The last of the three has, in particular, tended to become a very important factor determining the productive efficiency of industrial enterprises in India during the last few years. Comparisons of some of the important indexes of good labour-management relationship would throw useful light on the reasons for variations in input productivities. These indexes may comprise (i) man days lost, (ii) number of strikes, (iii) man days lost in strike, (iv) total of incentive earnings, and (v) total amount of pro-

duction bonus and attendance bonus earned (with reference to a given accounting period).

## 6. Concluding Notes

The efficiency of an enterprise depends upon (1) how far the decisions regarding investment satisfy the accepted criteria of efficiency, and (2) how far does the productive activity satisfy its implicit and explicit objectives, given a certain size of investment. Apart from the above, accidental factors may also bear upon the same, about which it would be difficult to make a generalisation.

The management of an enterprise may have a say in both the functions. But in the Indian context, investment decisions in the public sector are largely outside the range of the management's discretion. Decisions regarding the magnitude as well as the location of investment are taken at the level of the Government department. If the case is that of expansion of an existing plant, the management of the enterprise in question would definitely have a major say in the matter. Such cases are, however, very rare at present, (HMT is an example), as very few enterprises in the public sector are at the moment in a position to effect a reinvestment of capital on a substantial scale. In any case, in the ultimate analysis, the Government does exercise considerable measure of control over the investment policies of public undertakings.

But it is the responsibility of the management to ensure that the investment made is properly utilised, that the output of the enterprise is of the desired quality and is produced in the right quantity, and further that the cost of production is at the minimum possible level under the given conditions. The management can hardly be absolved of its responsibilities in these directions.

The range of discretion of the management in regard to both the formulation of policies and their implementation is limited by two sets of factors. In the first place, there are externally imposed constraints which restrict the freedom of the management in realising the commercial objectives of the

enterprise and putting the resources at its disposal to the best use. These constraints extend to a wide range of policy matters relating to output, pricing, distribution of products, personal management and labour relations. In the second place, the parameters governing the operation of the enterprises are very often outside the control of the management. A few important of these are input-prices, demand fluctuations and availability of raw materials.

It is not that these factors are specific to the public enterprise sector. In a regulated economy that we have, a large range of private enterprises operate under similar, though perhaps less rigorous, limitations. However, in the case of private enterprises, the management-goals are less diversified and accountability is more specific than in the case of public enterprises and this makes a good deal of difference insofar as the task of assessment of the management's performance is concerned.

The limitations on the management's discretion and the variations in them render the task of making meaningful comparisons for the purpose in view somewhat difficult. The greater the limitations on the management's discretion, the greater would be the risk of mis-interpretation and thereby the greater would be the need for sophistication in the analysis for the purpose. The task would be specially difficult if the objective in view is to make an overall analysis of the management's performance.

Notwithstanding the limitations arising out of the above factors, the prospects in this regard are not as they may, on the face of it, appear. In the first place, the constraints on the management's discretion do not alter very frequently, and even when they alter, the magnitude of the change is not very marked. The situation being such, time-series comparisons of very useful type can be made for the purpose in view. Secondly, in the case of most enterprises there is a great deal of scope for developing standards for judging actual performance. The possibilities in this regard are yet to be fully explored. Thirdly, with growing industrialisation both in the

public and the private sector, the possibilities of making inter-enterprise and inter-unit comparisons for the object in view will rapidly increase. There are a number of industrial sectors, in which both public and private units have been set up and it is possible that in due course, they would be competing with each other.

There is one point in this context which needs very careful attention. And that is that the Government should lay down the priorities among the management goals precisely and should also, if possible, decide about the relative weights that would be assigned to these. This is specially necessary in view of the fact that these goals may conflict with each other. In the absence of this, the management may lose the sense of direction, and, in retrospect, may be judged wrongly. The experience of the Soviet Union in this regard may be of some relevance in the Indian context.

Since 1934 the Soviet planners and economists have been engaged in the task of developing proper criteria for the measurement of success of the management in the Soviet enterprises. Although attempts were made to work out an integrated financial criteria for the purpose, its limitations were always recognised, and other indices relating to the management's performance, e.g., reduction in costs, achievement of output targets and improvement in quality of products were also used. The evaluating authorities did not, however, maintain consistency in their approach and the relative weights attached to the various criteria differed from enterprise to enterprise and from time to time. As a result of this, may managers had to suffer for having apparently misdirecting their production efforts.

In the interest of a proper discharge of managerial functions, it would, therefore, be desirable on the part of the Government to lay down the criteria on which its performance is likely to be assessed. What these criteria should be would depend upon a number of factors and would differ from enterprise to enterprise. In the preceding article an attempt was made to suggest a set of criteria for the purpose. But in view

of the mutiplicity and complexity of objectives with which public enterprises are established, it may be necessary to have a specific set of criteria for each enterprise individually. The relative weights attached to different management-goals in the public enterprises are very often widely differing as a result of which the criteria applicable in the case of one may not be same in the case of another. A trading concern may, for example, give a greater priority to purely commercial considerations of profitability than a public utility enterprise. Further, in case of defence undertakings the output and cost criteria may be of much greater importance than the financial criterion of profitability.

If the criteria are to be determined externally, what is the agency which should bear this responsibility? There are two alternatives in this regard. One is that the parent ministry of each enterprise should take up this task. This would ensure a correspondence between the basic objectives with which the enterprise is established and the structure of criteria proposed for its evaluation. The other alternative is that of an independent agency like the Comptroller and Auditor-General of India. The competence of the latter body has already been discussed in the previous paper. At this place, it may simply be mentioned that the time available to this agency may not be sufficient to cope up with the task. With the increase in the number of public enterprises in the country, the sheer burden of work involved in this connection may be too much for this agency to bear. On the whole, therefore, it may be more appropriate to leave it to be borne by the parent ministries concerned. But, whatever be the agency concerned, it would be worthwhile to associate the management of the enterprise in the determination of priorities in the criteria.

# MEASUREMENT OF THE MANAGEMENT'S CONTRIBUTION TO PROFITABILITY

(Some Methodological Problems of a Case Study of the  
Bihar Road Transport Corporation)<sup>1</sup>

## 1. Preliminaries

The object of this paper is to present, in brief, a summary of some of the methodological issues emerging in the empirical part of a research project on the measurement of the operational efficiency of public enterprises. As a part of this project, it was proposed to suggest a methodology for assessing the contribution of the management to the change in the profitability of public undertakings. The research project was sponsored by the Indian Institute of Public Administration, New Delhi.

In a pioneering kind of study of this type, there was little to draw from the existing literature for evolving an appropriate methodology for the purpose. The process by which this could be done was fairly tedious and in the ultimate analysis only a fair approximation to the ends in view could be achieved. In the following sections an attempt has

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1. This paper was written jointly by Dr. G. P. Keshava and Shri S. A. Khan, Research Fellow in the A. N. Sinha Institute of Social Studies, Patna-1. The authors are grateful to Prof. H. K. Paranjape for giving the basic inspiration to make an effort in this direction; to Prof. A. K. Das Gupta for his comment on some of the methodological issue relating to the research project; to Shri C. R. N. Singh, Chief Statistician, and Shri Jagdish Sinha, Head of the Planning Unit, of the Bihar Road Transport Corporation for providing the necessary material for the study, and to the authorities of the A. N. Sinha Institute of Social Studies, Patna, for extending their co-operation in conducting the study.

been made to give a resume of the various steps in the preparation of the methodology, elaborating at the same time, the practical difficulties in the analysis arising from inadequacy of material. The intention is to present an account of how the task was handled through its various stages.

The following section provides the general background and objectives of the study. The next three sections explain the strategy used for analysing the contribution of different factors to change in each of the three primary variables determining the profitability of the enterprise, viz., revenue, cost and capital. The sixth section is devoted to a discussion of the alternative ways in which the results obtained from the preceding analysis could be integrated to give the final results. The last section contains some concluding remarks regarding the project.

In order to facilitate exposition, the paper has been drafted in the form of a personal essay. The order in which the material contained in this paper is presented corresponds to that in which the problems referred to emerged in the course of work on the above mentioned research project.

## 2 The Setting

2.1. The subject of the research project on which we were working was "Measurement of Operational Efficiency of Public Enterprises". One of the major objects of the study was to suggest a methodology for assessing managerial efficiency and test the suitability of the same with reference to one undertaking. For certain reasons largely related to availability of data, the Bihar State Road Transport Corporation was selected for the latter purpose. With regard to the empirical part of the work the focus of our study was mainly on the measurement of change in the operational efficiency of the enterprise in question during 1959-60 to 1964-65. As a part of this endeavour, it was proposed to make an analysis of the change in the surpluses earned by the enterprise from one accounting period to another. The purpose behind this was to locate the factors accounting for the change in the rate of return on capital and measure the contribution of each of these factors to the same.

2.2. The rate of return on capital is a ratio between the gross surplus earned by the enterprise and the capital invested, and the gross surplus, in turn, is the difference between gross revenue and aggregate cost. Analysis of change in the rate of return on capital would have, therefore, to proceed through the analysis of change in each of these three major determinants of the rate of return on capital, viz., gross revenue, aggregate cost and capital invested. With reference to the Bihar Road Transport Corporation, our problem was to find out the factors which brought about a change in the values of these variables and the extent to which each of these factors contributed to the change in the rate of return on capital.

2.3 The main objective behind this factorwise analysis of revenue and cost was to measure separately the contribution of (1) the factors within the ambit of management's control, and (2) the factors outside managerial control, on changes in the rate of return on capital. The determinants or the factors had to be selected in such manner as to enable us to make an assessment of this kind. Our first task, therefore, was to undertake an examination of the cost and revenue data of the Corporation from this viewpoint. This was to be followed by construction of models explaining changes into each of the three variables, viz., (1) aggregate revenue, (2) aggregate cost, and (3) aggregate capital invested. The last stage of our work is to fit the model into the available operational statistics of the Corporation.

### 3. Analysis of Revenue

3.1. The main factors determining the aggregate revenue of the corporation, or for that matter, change in aggregate revenue between successive accounting periods, were (1) the volume of services offered by the enterprises for sale, (2) the extent to which the Corporation was able to sell its services, and (3) the price of the services. The volume of services offered, in turn, appeared to be a function of the productive capacity of the enterprise on the one hand and the intensity of utilisation of this capacity on the other. These factors accounted for the revenue from passenger fares which in turn

accounted for an overwhelming part of the gross revenues of the Corporation. A small part of the gross revenue consisted of collections from other sources, e.g., postal mail services and rent.

3.2. In the light of the above, a total revenue function was constructed to show the relationship between gross revenue as the dependent variable and the factors determining the size of gross revenue as an independent variable. Since the Corporation happened to be a multi-product firm, in the sense that the services it offered could be put in two categories on the basis of the fare (i.e., the price) charged for each, a revenue function was constructed for each category of service in the following form:

$$s \cdot x \cdot p = r \quad \dots(1)$$

where

$$s = \frac{\text{services sold}}{\text{services offered for sale}}$$

$x$  = services offered for sale

$p$  = price or fare per unit of service sold,

and

$r$  = total revenue realised from any category of service in any accounting period.

Marking the variables relating to the two categories of services offered by suffixes 1 and 2 total revenue function for the Corporation was constructed as follows:

$$s_{1i}x_{1i}p_{1i} + s_{2i}x_{2i}p_{2i} + e_i = R_i \quad \dots(2)$$

where  $e_i$  = revenue from sources other than passenger fare in year  $i$

and

$R_i$  = gross revenue of the corporation in year  $i$

3.3. By expressing gross revenue in terms of the variables,  $s$ ,  $x$  and  $p$ , the above function provided a means for analysing the change in revenue over time in terms of change in the values of these variables.

Thus if  $R_i$  and  $R_{i+n}$  represented the aggregate revenues of the corporation in year  $y_i$  and  $y_{i+n}$  respectively, the change in revenue during this period would be given by

$$R_{i+n} - R_i = s_{1,i+n}x_{1,i+n}p_{1,i+n} + s_{2,i+n}x_{2,i+n}p_{2,i+n} - (s_{1i}x_{1i}p_{1i} + s_{2i}x_{2i}p_{2i}) + (e_{i+n} - e_i) \quad \dots(3)$$

where the second suffixes on the right hand side denote the

accounting periods. Now, denoting the change occurring in the relevant variables during the period  $y_i$  to  $y_{i+n}$  with a  $\Delta$  sign, i.e.

$$\begin{aligned}s_{1,i+n} &= s_{1i} + \Delta s_{1i} \\x_{1,i+n} &= x_{1i} + \Delta x_{1i} \\p_{1,i+n} &= p_{1i} + \Delta p_{1i} \\e_{i+n} &= e_i + \Delta e_i \\ \text{etc. etc. etc.}\end{aligned}$$

the above equation for change in revenue could be written as

$$\begin{aligned}R_{i+n} - R_i &= \{(s_{1i} + \Delta s_{1i})(x_{1i} + \Delta x_{1i})(p_{1i} + \Delta p_{1i}) \\&\quad + (s_{2i} + \Delta s_{2i})(x_{2i} + \Delta x_{2i})(p_{2i} + \Delta p_{2i})\} \\&\quad - \{s_{1i}x_{1i}p_{1i} + s_{2i}x_{2i}p_{2i}\} + \Delta e_i \quad \dots(4)\end{aligned}$$

The right hand side of the above expression provided the basis for measuring the contributions at different factors, individually or severally to change in aggregate revenue, provided the values of  $\Delta s_{1i}$ ,  $\Delta s_{2i}$  etc. were all known.

3.4. The most important factor determining the value of the gross revenue and thereby contributing the largest amount in the change in revenue was found to be the output. Therefore we decided to analyse the output and study the effects of relevant factors on the magnitude of the output.

After a careful consideration of the factors bearing on output, it appeared proper to take "seat-miles" as the unit of output. The principal variables contributing to change in output were (1) number of buses at the disposal of the Corporation (2) average seating capacity of the buses, and (3) average mileage given by the buses in miles per bus.<sup>2</sup> The following multiplicative expression was found quite satisfactory for explaining the variation in the output,  $x$  due to above three factors.

$$x = b \cdot \bar{c} \cdot u. \quad \dots(5)^2$$

where

$b$  = the number of buses at the disposal of the Corporation,

$\bar{c}$  = average seating capacity of the buses, and

$u$  = average mileage given by the buses in miles per bus in any accounting period.

2. The expression(s) is again of the kind of a definitional equation. The reason for using this type of equation is the same as pointed out with reference to expression (2).

3.5 The above output function could be used to explain the change in each category of service offered by the Corporation over time in terms of the individual and combined effects of changes in the variables  $b$ ,  $\bar{c}$  and  $u$ . The change in the services offered by the Corporation between year  $i$  and year  $i+n$  could be expressed as

$$x_{i+n} - x_i = b_{i+n} \bar{c}_{i+n} u_{i+n} - b_i \bar{c}_i u_i \quad \dots(6)$$

the suffixes to the variables denoting the periods to which the variables in question related. Denoting the change in the independent variable with  $\Delta$  sign, so that

$$\begin{aligned} b_{i+n} &= b_i + \Delta b_i \\ \bar{c}_{i+n} &= \bar{c}_i + \Delta \bar{c}_i \\ u_{i+n} &= u_i + \Delta u_i \end{aligned}$$

the above expression for the change in output between the accounting periods  $y_i$  and  $y_{i+n}$  could be written as

$$\begin{aligned} x_{i+n} - x_i &= \Delta b_i \bar{c}_i u_i + b_i \Delta \bar{c}_i u_i + b_i c_i \Delta u_i + \Delta b_i \Delta \bar{c}_i u_i \\ &\quad + b_i \Delta \bar{c}_i \Delta u_i + \Delta b_i \bar{c}_i \Delta u_i + \Delta b_i \Delta \bar{c}_i \Delta u_i \end{aligned} \quad \dots(7)$$

For the two categories of output  $x_{1,i+n}$  and  $x_{2,i+n}$  the above expression could be written as :

$$\begin{aligned} &= \Delta x_{1,i} \\ x_{1,i+n} - x_{1,i} &= \Delta b_{1i} \bar{c}_{1i} u_{1i} + b_{1i} \Delta \bar{c}_{1i} u_{1i} + b_{1i} \bar{c}_{1i} \Delta u_{1i} \\ &\quad + \Delta b_{1i} \Delta \bar{c}_{1i} u_{1i} + b_{1i} \Delta \bar{c}_{1i} \Delta u_{1i} + \Delta b_{1i} \bar{c}_{1i} \Delta u_{1i} \\ &\quad + \Delta b_{1i} \Delta \bar{c}_{1i} \Delta u_{1i} \quad \dots(8) \\ &= \Delta x_{2,i} \end{aligned}$$

and,

$$\begin{aligned} x_{2,i+n} - x_{2,i} &= \Delta b_{2i} \bar{c}_{2i} u_{2i} + b_{2i} \Delta \bar{c}_{2i} u_{2i} + b_{2i} \bar{c}_{2i} \Delta u_{2i} \\ &\quad + \Delta b_{2i} \Delta \bar{c}_{2i} u_{2i} + b_{2i} \Delta \bar{c}_{2i} \Delta u_{2i} + \Delta b_{2i} \bar{c}_{2i} \Delta u_{2i} \\ &\quad + \Delta b_{2i} \Delta \bar{c}_{2i} \Delta u_{2i} \quad \dots(9) \end{aligned}$$

These two functions could be called as "output functions." These alongwith the "revenue function" of expression (4) provided an almost complete framework for making a factor-wise analysis of change in revenue with the objective in view.

3.6. The analysis of data following these models was, however, turned out to be a difficult task. In the first place, there were some difficulties in giving an operational content to

the conceptual variables. In the second place, the inadequate correspondence of the available data to the variables of the models gave rise to some different problems. Lastly, we were confronted with certain gaps in the data which greatly obstructed a neat application of our models.

3.7. In respect of the analysis of services offered (or change in the same) the "output functions" provided for the number of buses as a variable. With reference to the accounting period of one year, the number of buses at the disposal of the Corporation did not turn out to be a definite quantity as new buses were being added to the existing fleet in every year of the period covered by the study. In this context the best approximation to the number of buses at the disposal of the Corporation during any year would be given by the average of the daily fleet strength of the Corporation for the year in question.

Unfortunately, however, data in such detail were not available, making it incumbent on us to search for an alternative basis for making the required estimates. Another factor contributing to this was that the aggregate fleet strength turned out to be a rather unrealistic measure of the operating capacity of the enterprise, as it included many buses which were not in a running condition. A more realistic indicator of the operating capacity of the enterprise was provided by the buses held by the administrative divisions of the Corporation, which was bearing the responsibility of providing the services.

Keeping in view the availability of material and the objectives of the study we decided to adopt the buses held by the divisions as a measure of the operating capacity of the enterprise. Data on the number of buses held by the divisions on the last day of each month were available, and an average of these for the year provided a fairly good approximation of the operating capacity of the Corporation during the year in question.

3.8. The difficulties arising from the gaps in data were, however, more formidable. The revenue function had, apart from revenue, six major variables of the first degree compris-

ing the two categories of services provided  $x_1$  and  $x_2$ , their prices  $p_1$  and  $p_2$  and the realisation ratios  $s_1$  and  $s_2$  in respect of each. For arriving at a correct estimate of aggregate revenue on the basis of our revenue function, it was necessary to have information regarding each of these variables separately in each accounting period (here financial year). But  $p_1$  and  $p_2$  were the only variables regarding which adequate information was available. The available data on services provided were inadequate to the extent that while total seat-miles provided was known, the distribution of this total between  $x_1$  and  $x_2$  was not known. Similarly, data on the distribution of aggregate services sold between the two categories of the services provided could not be obtained.

3.9. Apparently the implications of the above were rather disappointing. With such gaps in data we could not estimate aggregate revenue on the basis of our revenue function, nor could we make a factor-wise analysis of change in revenue between different periods. A substantive modification in the function therefore became inevitable. The first step that we took in this direction was to ignore the distinction between the two categories of services. Thereby the original revenue function could be simplified to the following form

$$S.X.P.+e=R \quad \dots(10)$$

where

$$S = \frac{\text{aggregate services sold}}{\text{aggregate services offered}},$$

= overall realisation ratio,

$$= \frac{o_1 + o_2}{x_1 + x_2}, \quad \begin{cases} o_1 = \text{part of } x_1 \text{ sold} \\ o_2 = \text{part of } x_2 \text{ sold} \end{cases}$$

$X = x_1 + x_2 = \text{aggregate services offered, and}$

$$P = \frac{o_1 p_1 + o_2 p_2}{o_1 + o_2} = \text{weighted average of price.}$$

Actually the revenue written in the above form was in no way materially different from the previous one for operational purposes. Also it was not an improvement over the previous one. We could not estimate  $S$  for the simple reason that  $o_1 + o_2$  was not known. For the same reason  $P$  also could not be estimated. Thus it did not enable us to esti-

mate the aggregate revenue on the basis of the values of the independent variables. The main advantage of writing the function in the above form lay in that it opened a way for making the factor-wise analysis of change in revenue which was our main objective.

3.10. The main difficulty in making an analysis of change in revenue on the lines indicated by the previous function (expression 2 above) lay in the non-availability of information regarding the values of the major independent variables  $x_1$ ,  $x_2$ ,  $s_1$  and  $s_2$  in any year as well as changes therein between different years. The new function was also subject to the limitation arising from non-availability of the values of its major variables. But it was possible to measure the changes in the values of its variables over time with a fair degree of accuracy. Thereby, it enabled us to separate the contribution of the different factors to changes in aggregate revenue over time.

3.11. A careful scrutiny of the pattern of expansion of the operations of the Corporation led us to conclude that the proportion of each category of service ( $x_1$  and  $x_2$ ) to total services provided would not undergo a substantial change over a short period of say two to three years. For purposes of the analysis in view, we assumed that the ratio between  $x_1$  and  $x_2$  remained constant between any two consecutive years. This, in the first place, made it possible for us to estimate the change in services sold between consecutive years from the available information in the following way:

Denoting the constant ratio between the two categories of services sold by  $\mu$  so that

$$\frac{o_2}{o_1} = \mu$$

$$\text{or, } o_2 = \mu o_1$$

total revenue in year  $i=R_i$  was given by  $o_{1i}p_{1i} + o_{2i}p_{2i}$  ... (11)  
and total revenue in year  $i+n=R_{i+n}$  was given by  $o_{1,i+n}p_{1,i+n} + o_{2,i+n}p_{2,i+n}$  ... (12)

assuming that the prices did not undergo any change between year  $i$  and year  $i+n$

Dividing (12) by (11) above and substituting  $o_2$  in terms of  $o_1$ , we got

$$\frac{o_{1,i+n}(p_1, i+n + \mu p_2, i+n)}{o_{1i}(p_{1i} + \mu p_{2i})} = \frac{R_{i+n}}{R_i}$$

and if  $p_{1i} = p_{1,i+n}$  and  $p_{2i} = p_{2,i+n}$  (and it was found to be true)

then  $\frac{o_{1,i+n}}{o_{1i}} = \frac{R_{i+n}}{R_i}$

i.e.,  $o_{1,i+n} = o_{1i} \times \frac{R_{i+n}}{R_i}$  ... (13)

Similarly,  $o_{2,i+n} = o_{2i} \times \frac{R_{i+n}}{R_i}$  ... (14)

3.12. In other words, aggregate services sold in year  $i+n$  could be higher than that in year  $i$  in the same proportion as aggregate revenue in year  $i+n$  was higher than the same in year  $i$ . The expression (12) above could be modified to allow for price changes between year  $i$  and year  $i+n$ . Thus if the prices of each of the two categories of services in  $y_{i+n}$  were higher than those in  $y_i$  by the multiple  $m^3$  the expression (12) above could be written as

$$\begin{aligned} R_{i+n} &= m o_{1,i+n} p_{1i} + m o_{2,i+n} p_{2i} \\ &= m(o_{1,i+n} p_{1i} + o_{2,i+n} p_{2i}) \end{aligned} \quad \dots (15)$$

3.13. The assumption that  $\mu$  stayed constant further made it possible to estimate the change in the realisation ratios between consecutive years, on the basis of the available data on aggregate revenue, prices and aggregate services offered in each year. On this assumption, the ratio between the over all realisation ratios relating to any two accounting periods turned out to be the same as the ratio between the revenue per unit of service offered in the corresponding accounting period. Expressed in symbols

$$\frac{S_{i+n}}{S_i} = \frac{R_{i+n} X_i}{R_i X_{i+n}} = \theta, \text{ say}$$

3. As a matter of fact, this was the only kind of price change that we came across in the course of our study.

from which it followed that if  $\theta$  be known,  $\Delta S_i$  could be calculated, for

$$\text{if } \frac{S_{i+n}}{S_i} = \theta$$

$$\text{and } S_{i+n} = S_i + \Delta S_i$$

$$\text{then } S_i + \Delta S_i = \theta S_i$$

$$\text{or } \Delta S_i = (\theta - 1)S_i$$

3.14. The method by which this result was arrived at was as follows :

Let  $\lambda_i$  represent Aggregate Revenue in year  $i$   
Average price

$$\text{so that } \lambda_i = \frac{o_{1i}p_{1i} + o_{2i}p_{2i}}{\frac{1}{2}(p_{1i} + p_{2i})} = \frac{R_i}{\frac{1}{2}(p_{1i} + p_{2i})}$$

$$\text{and } \lambda_{i+n} = \frac{R_{i+n}}{\frac{1}{2}(p_{1i+n} + p_{2i+n})} = \frac{R_{i+n}}{\frac{1}{2}(p_{1i} + p_{2i})}$$

Substituting  $\mu o_{1i}$  for  $o_{2i}$  we have

$$\lambda_i = \frac{o_{1i}p_{1i} + \mu o_{1i}p_{2i}}{\frac{1}{2}(p_{1i} + p_{2i})}$$

$$\text{or } o_{1i} = \frac{\frac{1}{2}\lambda_i(p_{1i} + p_{2i})}{p_{1i} + \mu p_{2i}}$$

$$\text{Similarly, } o_{2i} = \frac{\frac{1}{2}\lambda_i(p_{1i} + p_{2i})\mu}{(p_{1i} + \mu p_{2i})}$$

$$\text{and } o_{1i} + o_{2i} = \frac{\frac{1}{2}\lambda_i(p_{1i} + p_{2i})(1 + \mu)}{(p_{1i} + \mu p_{2i})} \quad \dots(16)$$

Proceeding in the same way it can be shown that

$$o_{1i+n} + o_{2i+n} = \frac{\frac{1}{2}\lambda_{i+n}(p_{1i+n} + p_{2i+n})(1 + \mu)}{p_{1i+n} + \mu p_{2i+n}} \quad \dots(17)$$

Assuming that the prices in the year  $i+n$  are the same as in year  $i$ , i.e.,  $p_{1i} = p_{1i+n}$  and  $p_{2i} = p_{2i+n}$  then the expressions (16) and (17) above could be written as

$$o_{1i} + o_{2i} = \lambda_i \beta_i$$

$$o_{1i+n} + o_{2i+n} = \lambda_{i+n} \beta_{i+n}$$

$$\text{where } \beta_i = \frac{\frac{1}{2}(p_{1i} + p_{2i})(1 + \mu)}{p_{1i} + \mu p_{2i}} = \beta_{i+n} = \beta, \text{ say}$$

the ratio between the realisation ratios in year  $i$  and year  $+n$  could therefore, be equal to

$$\theta = \frac{S_{i+n}}{S_i} = \frac{o_{1i+n} + o_{2i+n}}{X_{i+n}} \div \frac{o_{1i} + o_{2i}}{X_i}$$

$$\begin{aligned}
 &= \frac{\lambda_{i+n} \beta_{i+n} X_i}{\lambda_i \beta_i X_{i+n}} = \frac{\lambda_{i+n} \beta}{\lambda_i \beta} \frac{X_i}{X_{i+n}} = \frac{\lambda_{i+n} X_i}{\lambda_i X_{i+n}} \\
 &= \frac{R_{i+n} X_i}{R_i X_{i+n}}
 \end{aligned} \quad \dots(18)$$

In case the price of each of the two categories of services in year  $i+n$  was  $m$  times higher than that in year  $i$ , i.e.,  $p_{i+n} = mp_i$ , then

$$\begin{aligned}
 \theta &= \frac{S_{i+n}}{S_i} = \frac{\lambda_{i+n} X_i}{\lambda_i X_{i+n}} = \frac{R_{i+n}}{\frac{1}{2}m(p_{1i}+p_{2i})} \times \frac{\frac{1}{2}(p_{1i}+p_{2i})}{R_i} \times \frac{X_i}{X_{i+n}} \\
 &= \frac{1}{m} \times \frac{R_{i+n} X_i}{R_i X_{i+n}}
 \end{aligned} \quad \dots(19)$$

3.15. The relationships between realisation ratios relating to consecutive years being thus determined, the contribution of the different variables in question to the change in aggregate revenue between the consecutive years could be estimated by the use of the following relationship

$$(X_i + \Delta X_i)(S_i + \Delta S_i)(P_i + \Delta P_i) - X_i S_i P_i + e_{i+n} - e_i = R_{i+n} - R_i \quad \dots(20)$$

where  $\Delta X_i = X_{i+n} - X_i$   
 $\Delta S_i = S_{i+n} - S_i$   
 $\Delta P_i = P_{i+n} - P_i$

The expansion of the left hand side of the above expression gave

$$\begin{aligned}
 &\Delta X_i S_i P_i + X_i \Delta S_i P_i + X_i S_i \Delta P_i + \Delta X_i \Delta S_i P_i + \Delta X_i S_i \Delta P_i + \\
 &\quad X_i \Delta S_i \Delta P_i + \Delta S_i \Delta X_i \Delta P_i + \Delta e_{i+n} - e_i \dots(21)
 \end{aligned}$$

where  $\Delta e_i = e_{i+n} - e_i$

The product terms in the above expansion represented the contribution of the variables X, S and P, individually and severally, to the change in aggregate revenue between year  $i+n$  and year  $i$ . Each of the above constituents could be estimated from the available data on aggregate revenue, prices and services offered. Thus, to facilitate the calculation the different contributions of the relevant variables could be written in the following form:

$$\begin{aligned}
 (i) \quad \Delta X_i S_i P_i &= \Delta X_i \frac{o_{1i} + o_{2i}}{x_{1i} + x_{2i}} \times \frac{o_{1i} p_{1i} + o_{2i} p_{2i}}{o_{1i} + o_{2i}} \\
 &= \Delta X_i \times \frac{R_i}{X_i}
 \end{aligned} \quad \dots(22)$$

$$(ii) \quad X_i \Delta S_i P_i = X_i (\theta - 1) S_i P_i = (\theta - 1) R_i \quad \dots (23)$$

$$(iii) \quad X_i S_i \Delta P_i = X_i S_i (m - 1) P_i = (m - 1) R_i^4 \quad \dots (24)$$

$$(iv) \quad \Delta X_i \Delta S_i P_i = (\theta - 1) \Delta X_i S_i P_i = (\theta - 1) \frac{\Delta X_i}{X_i} \times R_i \quad \dots (25)$$

$$(v) \quad \Delta X_i S_i \Delta P_i = \Delta X_i S_i (m - 1) P_i = (m - 1) \Delta X_i \frac{R_i}{X_i} \quad \dots (26)$$

$$(vi) \quad X_i \Delta S_i \Delta P_i = X_i S_i P_i (\theta - 1) (m - 1) = (\theta - 1)$$

$$(vii) \quad \Delta X_i \Delta S_i \Delta P_i = \Delta X_i S_i P_i (\theta - 1) (m - 1) \frac{(m - 1) R_i}{X_i} \quad \dots (27)$$

$$= (\theta - 1) (m - 1) \frac{R_i \Delta X_i}{X_i} \quad \dots (28)$$

Since every thing of the R.H.S. of the above identities was known, the different factor effects could be evaluated without any difficulty, the last term of expression (15) above i.e.,  $\Delta e_i$  being directly available from the data. The analysis of revenue was thereby completed with a reasonable measure of correspondence to our basic objections.

#### 4. Analysis of Cost

4.1. The basic purpose behind the analysis of cost was the same as that in the case of analysis of revenue. Our first task was to identify the major variables on which aggregate cost depended from the viewpoint of assessment of managerial performance. This was to be followed by an analysis of the individual and combined contributions of these variables to change in aggregate cost of the enterprise over time.

4.2. With these objectives in view, we constructed the cost function for the Corporation as follows:

$$(b_i \times u_i \times c_i) + (D_i + I_i) b_i + T_i = \text{Aggregate cost} \quad \dots (29)$$

where  $b_i$  = Number of buses held

$u_i$  = Utilisation factor

$c_i$  = Actual operational cost per bus mile in money terms

4. If  $m$  were the multiple by which  $p_{1,i+n}$  and  $p_{2,i+n}$  were higher than  $p_{1i}$  and  $p_{2i}$  i.e.  $p_{1,i+n} = m p_{1i}$  and  $p_{2,i+n} = m p_{2i}$  then it could be easily shown that  $p_{i+n} = m p_i$ . From this it could be derived that  $\Delta p_i = p_{i+n} - p_i = (m - 1) p_i$ . Similarly, it could also be shown that  $\Delta S_i = (\theta - 1) S_i$  when  $S_{i+n} = \theta S_i$ .

$D_i$ =Depreciation cost per bus held

$I_i$ =Interest charges

$T_i$ =Miscellaneous capital costs in the year  $i$ .

The subscripts were used to denote the period to which the variables related.

The first part of the left hand side of the above equation, *b.u.c.*, gave the operational cost of running the services, including the cost of overheads. The second part of the expression  $(D_i + I_i)$  represented that part of the capital cost which directly varied with the operational capacity of the enterprise.

4.3. The construction of the cost function gave rise to several methodological problems.. In the light of the objectives behind cost analysis, we could not go very far towards constructing a function which would enable a precise measurement of the individual and combined effects of the different variables on aggregate cost. The main variables determining the size of aggregate cost, as well as changes therein, were (1) the number of buses held, which broadly represented the aggregate capacity. (2) the degree of utilisation of these buses, (3) the consumption of inputs per unit of output produced, and (4) the price of inputs. The first difficulty arose from the fact that operational and non-operational costs responded in different ways to changes in these variables. For this reason, it was not possible to build a simple multiplicative equation for analysis of operational cost, on the pattern of the analysis of tariff revenue. Operational costs were functionally related to the output (services offered) in terms of bus-miles and not seat-miles which constituted the unit of measurement of output for analysis of revenue. Logically, seat-mile provided a better unit for the measurement of the services provided by a passenger transport undertaking. It was not, however, possible to introduce seat-mile as an explicit variable in our model for analysis of cost, and to that extent the function in question was incomplete.

4.4. But the most serious problem that we faced was that of making provision in the model for analysis of effects of price-change. There was every justification for treating

the price-level of inputs (e.g., fuel, labour) as an independent variable determining the level of aggregate cost as well as the variations in the same over time. But the methodological difficulties in introducing input prices as explicit variable in the model were too great to be tackled. For, measurement of cost in terms of use of inputs in physical units was an impossible task. The only method of measuring cost per unit of output (bus-miles) was to reduce the real elements of cost into value in money terms. The implicit implication of this was that the factor representing unit cost in money terms in any year would be a compound of two factors, one being consumption of inputs in real terms, and the other representing the price level of inputs in the year in question.

4.5. From this emanated one major limitation of the use of our cost equation for a factor-wise analysis of change in aggregate cost over time. Using the notations and  $i+n$  for variables relating to year  $i$  and year  $i+n$  change in aggregate operational cost between year  $i+n$  and year  $i$  was given by

$$(b_i + \Delta b_i)(u_i + \Delta u_i)(c_i + \Delta c_i) - b_i u_i c_i \quad \dots(30)$$

where

$$\Delta b_i = b_{i+n} - b_i$$

$$\Delta u_i = u_{i+n} - u_i$$

$$\Delta c_i = c_{i+n} - c_i$$

Expanding the expression (30) above we got change in operational cost

$$\begin{aligned} &= u_i \Delta b_i c_i + u_i \Delta b_i \Delta c_i + c_i \Delta u_i b_i + c_i \Delta u_i \Delta b_i \\ &\quad + \Delta c_i b_i u_i + \Delta c_i b_i \Delta u_i + \Delta c_i \Delta u_i \Delta b_i \end{aligned} \quad \dots(31n)$$

The constituents of the above expression indicated the contribution of change in unit cost, individually and in combination with other factors, to the change in aggregate operational cost between year  $i$  and year  $i+n$ . The overall contribution of change in unit cost to the change in aggregate cost would, however, be the combined effect of change in usage of inputs per unit of output (here services rendered) and change in input prices.

4.6. From the viewpoint of the basic objective of analysis of cost, it was necessary to find out some way of measuring the effect of the two factors separately. The method

that we adopted to tackle this problem was very simple. We estimated the change in input prices between consecutive years and thus prepared chain indices of change in input prices. Using these indices we deflated the different constituents of aggregate operational cost in each year and thus estimated the aggregate operational cost in each year at the previous year's prices. The difference between the actual and the deflated aggregate operating cost was taken as an indicator of the effect of price change on cost.

This was obviously a rather crude method for the purpose in view. It gave a little exaggerated estimate of the effect of price change on cost, in the sense that it merged the main and interaction effects of price change in one category and attributed the entire whole to change in price. But this was the best that could be done in view of the complexity of the phenomenon being studied.

Separating the change in aggregate cost on account of variation in input-prices from that in other factors, the change in total cost was given by

$$u_i \Delta b_i c_i + u_i \Delta b_i \Delta c_i + c_i \Delta u_i b_i + c_i \Delta u_i \Delta b_i + \Delta c_i b_i u_i + \Delta c_i b_i \Delta u_i + \Delta c_i \Delta u_i \Delta b_i + b_i (\Delta D_i + \Delta I_i) + \Delta h_i \quad \dots (31a 9)$$

where

$\Delta h_i$  = additional cost on account of change in input-prices, and

$\Delta c_i$  = change in unit cost at constant input prices

4.7. The problems, however, did not end with the construction of the model. Analysis of data in pursuance of even this modified sort of model gave rise to some difficult problems necessitating considerable manipulation of available information. In particular, the construction of indices for deflating the data, as indicated above, turned out to be a formidable task. The main components of operating cost were labour, spare parts and fuel. Estimation of the price change in respect of each of these was beset with problems of its own kind arising from the nature and form in which data were available.

4.8. In order to deflate the aggregate expenditure on labour in each year, we had first to estimate the price of labour in each accounting period. Apparently, this was a very

simple task involving the division of aggregate expenditure on labour by the total number of men employed in each year. In operational terms, however, working out this quotient necessitated, in the first place, defining the content of both these aggregates. The "wage bill" of the enterprise comprised (1) Salaries of Officials, (2) Dearness Allowance (e.g., house rent and medical allowances), (3) Fringe Benefits, and (4) Travelling Allowance. Obviously, the latter part of the "Wage-bill" consisting of travelling allowance could not be regarded as expenditure on labour. As such, we decided to exclude the travelling allowances in estimating the expenditure on labour for the purpose in view.

In the case of the other variable, the aggregate labour force employed, the conceptual problem lay in determining a representative aggregate for a year as a whole. The Corporation was employing various categories of labour distinguished from each other in terms of nature of work performed as well as status and emoluments. The question was whether it would be right to lump them together in one whole. Further, the strength of labour force employed was a variable changing from month to month, even from day to day (especially since the Corporation was expanding rapidly). In this circumstance, our problem was to determine the aggregate which represented the staff position of the Corporation most appropriately and precisely.

A study of the employment structure of the Corporation showed that the proportions between the different categories of staff of the Corporation did not vary much from year to year. Since our interest basically lay in making comparisons between price of labour in successive accounting periods, we adopted the aggregate staff strength in each year as an index of labour employed. In view of the stability of the proportions between the different categories of staff, we did not think it necessary to assign weights to these categories in each accounting period and convert the various constituents of labour employed into homogeneous units. As regards the complication arising from the fluctuations in the staff strength, it was obvious that the problem could be solved only by strik-

ing some kind of average of the staff strength at different points of time. Conceptually, the best approximation to the overall annual position would be provided by a simple average of the daily staff strength during the course of the year. A study of the available data, however, revealed that the average of the monthly staff strength gave almost as good results as that of the daily staff strength. As such, we decided to adopt the former for the purpose in view.

The initial difficulties of a conceptual nature were however, followed by more formidable problems of estimating the values of the referent aggregates, arising, mainly, on account of certain gaps in the available data. For estimating aggregate expenditure on labour, we had data on wages and salaries in the Revenue Account of the Corporation. But the aggregates under the head "Wage and Salaries" in the Revenue Account included the "travelling allowances" as well. Data on aggregate travelling allowance in each year were not available, and as such the figures given in the Revenue Account could not be corrected for the purpose in view. A break down of aggregate "wage-bill" between salaries and wages and travelling allowance was available in the annual budgets of the Corporation, but the corresponding aggregates of the Revenue Account and the Budget did not tally with each other. The reason for this was that whereas the Revenue Account gave the amount chargeable to the accounting period in question, the Budget gave the amount actually drawn during the period. The two did not tally because part of the amount technically spent during each year was actually disbursed in the succeeding year.

4.9. In this situation, the only way open to us was to make a rough approximation of the relevant aggregate by combining the information available in the two sources, viz., the Revenue Account and the Budget. The strategy adopted by us was to make a rough assessment of that part of expenditure on labour (as shown in the Revenue Account) which was accounted for by travelling allowances and then deduct it from the total. To this end we assumed that the proportion of aggregate travelling allowance to the aggregate "wage-bill" in the Budget was fairly representative of the same in

the Revenue Account. We had some definite reasons to believe in the validity of this assumption, which could be expressed as follows:

$$\frac{\text{Aggregate Travelling Allowance (Budget)}}{\text{Aggregate Expenditure on Labour (Budget)}} = \frac{\text{Agg. Travelling Allowance (Revenue Account)}}{\text{Agg. Expenditure on Labour (Revenue Account)}}$$

Denoting the left hand side of the above expression by  $\eta$  and the denominator of the right hand side by  $E$ , the above expression could be written as

$$\frac{\eta}{E} = \text{Agg. Travelling Allowance (Revenue Account)}$$

$$\text{Or, Agg. Travelling Allowance (Revenue Account)} = \eta E \quad \dots (32)$$

Therefore, Net expenditure on labour exclusive of travelling allowance  $= (1 - \eta) E$

We examined the estimates of net expenditure on labour derived on the basis of the above formula and found them to be logically acceptable.

4.10. The statistical bottlenecks, in the estimation of the staff strength were largely of the same kind as in the estimation of aggregate expenditure. Here again there were certain gaps in the data which stood in the way of making a precise estimate of the relevant aggregate. As indicated above, our strategy in this regard was to take an average of the aggregate staff strength of the Corporation at the end of every month. But unfortunately, monthly figures were available for only a part, although a major part of the aggregate staff strength. Administratively, the Corporation comprised: (i) The Headquarters, (2) the Central Workshop, and (3) the (operational) Divisions. It was in respect of the third alone that we could get complete information on the staff strength at the end of every month. In respect of others we had information on staff strength at the end of each year only. We had, therefore, to find out some way of estimating the monthly average of the staff employed in the central units, i.e., the Headquarters and the Central Workshop.

4.11. A study of the trends in the time series data on

the components of the staff strength of the Corporation showed that there was a remarkable relationship between the staff employed in the central units and that in the divisions. Broadly, the size of the staff at the central units varied directly with that in the divisions. In the light of this, we considered it quite reasonable to assume that the proportion of the staff employed in the central units to the total staff strength of the corporation stayed constant through time. On the basis of this assumption, we could make a rough estimate of the average of the monthly staff strength in the central units of the Corporation in the following way.

Using the symbols

$N_i$  for the average of central staff at the beginning and end of year  $i$ ,

$\bar{D}_i$  for the average of divisional staff at the beginning and end of year  $i$ ,

$n_i$  for the monthly average of central staff in year  $i$ , and

$\bar{d}_i$  for the monthly average of divisional staff in the year  $i$ ;

on the basis of the assumption in question it could be shown that

$$\frac{N}{\bar{D}_i} = \frac{n_i}{\bar{d}_i}$$

So that  $n_i = \frac{N_i}{\bar{D}_i} \bar{d}_i$  ... (33)

Necessary data for estimating the values of each of the variables on the right hand side of the expression (33) were known and thereby the value of  $n_i$  the unknown variable, could also be estimated.

4.12. In the case of spare parts, our task of measurement of overall price change was beset with the problem of averaging the changes in the price of a multiplicity of individual items. The number of spare parts used in buses went into as much as one thousand. Records of purchase made by the Corporation showed that the prices of these items did not all change at the same time and in the same proportion. Thus our task was to prepare an index of price change which would be fairly representative of the changes in the prices of a large range of individual items.

From the point of view of statistical accuracy, an appropriate method for the purpose might have been to take a weighted average of prices in each year, using the expenditures on the respective items as weights. This would, however, have involved an enormous amount of effort in view of the large number of items to be covered. Another factor which was likely to stand in the way of this was the paucity of detailed information on expenditure on each item in each year under study.

In view of the above, we decided to take a sample of the spare parts and measure the average change in the price of this lot. The strategy adopted was to construct, first, the index of price level of each item in each year with the previous year as the base. A weighted average of these indices was then derived using the expenditure on the respective items in the base year as weights. We examined these results on a purely logical plane, and then compared them with the results obtained by using alternative methods and found them to be fairly satisfactory. (For instance, we derived a simple, unweighted, average of the price relatives in respect of the items covered in our sample and found that the results obtained by the method compared well with the weighted average).

4.13. As in the case of spare parts, measurement of the change in prices of fuel was also rendered difficult by the multiplicity of prices and non-availability of data. Under fuel the major items to be taken into account were three, petrol, diesel and lubricants. We found that in almost every accounting period in question, the Corporation was buying each of these items from several suppliers, each supplier charging his own price, for the consignment made by him.

Apart from that, the same supplier charged different prices for consignments at different delivery stations. Further the prices charged by the supplier for these commodities were revised rather frequently, sometimes twice or thrice in the same accounting period.

4.14. The difficulties in the way of estimation of price change arising from these factors could, of course, be overcome by a process of averaging. We could first estimate the

weighted average of prices of each of these items at each delivery point. This could be done as follows.

If  $p_{a1}, p_{a2}, p_{a3}, \dots$  represented the prices of the commodity in question delivered at any delivery point, and  $q_1, q_2, q_3, \dots$  were the quantities of the commodity bought at the above prices respectively during any year, the weighted average price of the commodity for the year as a whole at the delivery point,  $j$  would be given by

$$\frac{p_{a1}q_1 + p_{a2}q_2 + p_{a3}q_3 + \dots}{q_1 + q_2 + q_3 + \dots} = \bar{p}_{aj} \text{ (say)} \quad \dots(34)$$

Thus if there were  $n$  delivery stations we would get  $\bar{p}_{a1}, \bar{p}_{a2}, \bar{p}_{a3}, \dots, \bar{p}_{an}$  prices of the commodity in question at different stations.

The next step would be to take an overall weighted average of these prices for the entire State (since total cost figures were available for the entire State and not divisionwise). This would be given by

$$\frac{\bar{p}_{a1}Q_1 + \bar{p}_{a2}Q_2 + \dots + \bar{p}_{an}Q_n}{Q_1 + Q_2 + \dots + Q_n} = \bar{P}_a \quad \dots(35)$$

$Q_1, Q_2, \dots, Q_n$  denoting the quantities of the commodity being sold at prices  $\bar{p}_{a1}, \bar{p}_{a2}, \dots, \bar{p}_{an}$  respectively.

4.15. Our efforts in the direction of working out an average price of the fuel items according to this method were, however, frustrated on account of lack of adequate data. Of the three items under fuel, diesel, petrol and lubricants, we could get reasonably extensive information on prices of diesel only. Comparable information regarding petrol was available only for two years of the six years' coverage of the study.

The case of lubricants was still more disappointing. As regards quantities sold at various prices, the information available was even more inadequate. In respect of diesel, we had data on prices at each delivery point, for all the years, being studied. But we could not get complete information on the quantities delivered at different points of time. The same was true of petrol, with the additional handicap that for three years out of the six under reference, data on even prices was insufficient. As for lubricants, the gaps were much more accentuated in respect of both.

4.16. We tried to work out the average price of diesel and petrol, which accounted for the major part of expenditure on fuel, by modifying the method of averaging in a certain measure. In place of quantities delivered, we used miles run or effective mileage as weights. The relative position in regard to the quantities delivered at the different delivery stations could well be reflected in the relative position in regard to the number of miles given by the buses drawing fuel from each delivery station. Here again, however, we were hampered by lack of adequate information. We had full information on bus-mileage in each division but we could not get its break-down between mileage fuelled by each delivery station. Probably, it was not possible to collect information in such detail. In order to get out of the difficulty we estimated the price for each operational division by taking a simple average of the prices at different delivery points in each division having multiple delivery stations. Obviously, this was a crude method to follow and introduced a built-in error in our estimates, but this was probably the best that could be done under the circumstances.

4.17. The delivery prices of each division having been thus determined, we estimated the average price of diesel in each year as follows:—

$$\text{Price of diesel} = \bar{P}_8 \\ = \frac{\bar{p}_{\delta_1} m_1 + \bar{p}_{\delta_2} m_2 + \bar{p}_{\delta_3} m_3 + \dots}{m_1 + m_2 + m_3} \quad .(36)$$

where  $\bar{p}_{\delta_1}$ ,  $\bar{p}_{\delta_2}$ ,  $\bar{p}_{\delta_3}$ ...etc. stood for the delivery prices of diesel in each division,

and  $m_1$ ,  $m_2$ ,  $m_3$ , etc. stood for the total bus mileage in each division.

4.18. We used the same methodology as above for estimating the price of petrol in those years for which data were available and compared the results obtained with this method with the index number of wholesale prices of diesel and petrol prepared by the Directorate of Economics and Statistics in the Ministry of Commerce and Industry. As it turned out, the two sets of estimates were fairly comparable, showing, on the one hand, the reliability of the method used by us for the

purpose, and on the other hand, the validity of using the wholesale price indices for deflating the fuel costs. Thus, we could confidently use the wholesale price indices for measuring the change in the prices of lubricants and that of petrol for those years for which sufficient data were not available for constructing price indices following our methodology.

4.19. The problem of lack of adequate data for constructing suitable weights for averaging had to be faced in measuring change in the prices of tyres and tubes as well. Since tyres and tubes were two distinct items, it would have been only appropriate to measure the price change in respect of each individually, and deflate the aggregate expenditure on each separately. But expenditure on the two was not recorded separately, which necessitated the construction of a composite index of price change for both the commodities, necessitating, in turn, the determination of weights for the purpose of averaging. But in the absence of some indication of the share of each in the total expenditure on these items in each year we did not have any firm basis for the same.

4.20. In this circumstance, only two ways were left open to us; either we could take the price relatives of each commodity in each year and average it, or we could take the sum of absolute prices of these in each year and average it. We tried both and found that the results obtained by the use of one were fairly comparable with that of the other. Finally, on the basis of an evaluation of the relative merits of the two methods on a purely logical plane, we decided to adopt the latter for the purpose in view.

4.21. Apart from the major items of expenditure as listed above, there were a large range of items, e.g., consumable stores, tarpaulins, etc., on which a substantial amount was being spent. A precise measurement of the change in the prices of these commodities was a more or less an impossible task. The great variety of these items, as well as the multiplicity of prices at which they were being purchased, stood in the way of designing a sampling technique which could be claimed to be reasonably free from bias. As such, we thought it appropriate to deflate the figures of ex-

penditure on these miscellaneous items by the index number of wholesale prices (finished products) prepared by the Ministry of Commerce and Industry, Government of India.

4.22. On the basis of the indices of price change prepared in the above manner, the constituents of cost were deflated with a view to estimating the effect of change in input prices on aggregate money cost. Two types of indices were prepared, one indicating price change over the previous year and the other indicating changes in prices over a base year, which was the first year of the period covered by the study. The figures of cost in each year were first deflated by the index of price change with the previous year as the base. This gave an estimate of additional money cost incurred by the Corporation in each year on account of the increase in input prices in that year over the same in the previous year. This was followed by a further process of deflation for using the second type of indices. This gave the additional money cost incurred in each year on account of the increase in prices over that in the base year.

### 5. Analysis of Capital

5.1. From the methodological angle, the main problem in this part of our work was that of estimating the working capital of the Corporation in each year.

5.2. The accounts of the Corporation as such did not make an explicit reference to the working capital employed by the Corporation. But indirectly we could make a rough estimate of the same in each year. The first step in this direction was to investigate the sources from which the working capital of the enterprise could possibly be drawn. The main sources of funds available to the Corporation were (a) the grants made by the Government in the form of contribution to share capital and long term loans, (b) short-term borrowings from the Government or the State Bank, and (c) the Corporation's own funds comprising the Depreciation Reserve Fund and General Reserves. We observed that, broadly, there was a correspondence between the sum of depreciation reserve fund and took value of the fixed assets of the Cor-

poration on the one hand and aggregate share and (long term) loan capital of Corporation on the other. This was explained by the fact that the grants given by the Government were usually for specific capital projects. In view of this, it would reasonably be surmised that the working capital of the Corporation was drawn from the two sources of funds available to it.

The possible sources of working capital having been thus located, we set upon working out the amount invested as working capital in each year on the basis of an analysis of the receipt and disposal of these funds as reflected in the balance sheet of the Corporation for each year.

5.3. The outstanding short term borrowing from the State Bank could entirely be considered as constituting a part of the working capital of the Corporation. An additional argument in support of this presumption was that the short term loans advanced by the State Bank were definitely for purposes other than investment in fixed assets. The part of the Depreciation Reserve Fund which was drawn upon for meeting the requirements of working capital could be assessed by analysing the disposal of the money under the Fund. As per rules relating to management of its finances, the Corporation was expected to deposit the provisions made for depreciation with the State Government and withdraw it as and when required for replacing the condemned vehicles. Normally, therefore the Depreciation Reserve Fund as shown on the liability side of the balance sheet could be expected to compare with the outstanding long term deposits of the Corporation with the Government. On examination, however, we found that there was a considerable discrepancy between the two and since there was no other rational explanation for this, we surmised that the difference between the Depreciation Reserve Fund and the Corporation's deposits with the Government represented broadly the part of the Fund being used as working capital.

5.4. We could not however devise a reliable method for assuming whether any part of the General Reserve Fund of the Corporation was being used as working capital. Concep-

tually, it was not impossible to do so. An examination of the ways and means position of the enterprise could have thrown some light on the question, but the size of the General Reserve Fund of the Corporation was itself so small that the task did not appear to be worth undertaking.

Following the procedure indicated above, we worked out the working capital of the Corporation as the difference between the aggregate provisions made for depreciation and the part of it which was actually deposited with the Government. The working capital thus estimated was added to the aggregate capital invested in the Corporation by way of share capital and long term loans. In symbols, change in capital invested could be shown as:

$$\Delta K = \Delta k + \Delta w^4 \quad \dots(37)$$

where  $\Delta K$  = Change in total capital invested  
 $\Delta k$  = Change in fixed capital  
 $\Delta w$  = Change in working capital.

## 6. Analysis of rate of return on capital

6.1. As indicated in Section 2 above, the analysis of revenue, cost, and capital was intended to explain the reasons for change in the rate of return on capital. The focus of our study was on, (a) locating the operational variables which accounted for change in the rate of return on capital, and (b) measuring the individual and combined contributions of these factors to change in rate of return on capital over time.

4. The above method of estimating aggregate capital invested in the Corporation was obviously open to criticism. It was certainly unconventional in the sense that generally capital-investment is not measured in the above manner for estimating the return on capital invested in public or private enterprises. Usually, it is either the "block capital" or the 'equity capital' which is taken as the basis for estimating the rate of return on investment both in the case of private and public undertakings. Conventionally the total capital invested in the enterprise is estimated by adding together (1) the equity capital, (2) the loan capital, and (3) funds and provisions (including the Depreciation Reserve Fund). In the particular case of the Bihar Road Transport Corporation, however, we considered it necessary to make a departure from the conventional method of measurement of total capital, in view of the special provisions governing the disposal of the Depreciation Reserve Fund, as a result of which a major part of this fund was immobilised, as deposits, with the Government.

Since rate of return itself was a function of three primary variables, viz., revenue, cost and capital, we looked for variables determining changes in each of these three. This gave us altogether a series of secondary variables accounting for change in the rate of return through their bearing on the primary variables. These secondary variables were, the number of buses, utilisation factor, etc. Our main task in the analysis of rate of return was to estimate the effect of changes in these secondary variables on the rate of return on capital.

6.2. The secondary variables could be put into five categories; (1) those which accounted for changes in revenue only, (2) those which had a bearing on both revenue and cost, (3) those which accounted for changes in cost only, (4) those which had an incidence on cost, capital and revenue, all the three, and (5) those which had a bearing on capital alone. Thus the variables, the price of services sold,  $P_i$ , the non-passenger revenues, ( $S_i$ ), the realisation factor, ( $e_i$ ), and average seating capacity of the buses, ( $\bar{c}_i$ ), could be put in the first category. The variable ( $u_i$ ) representing the utilisation factor could be regarded as the variable belonging to the second category. The operational cost per unit of services offered, ( $c_i$ ) and the additional cost arising from change in the price level of inputs were the variables belonging to the third category. Capacity represented by the number of buses held, ( $b_i$ ) was a variable belonging to the fourth category. And finally, working capital, ( $w_i$ ) could be treated as the variable belonging to the fifth category, independent of the change in other variables.

6.3. The way in which changes in the above factors (secondary variables) brought about changes in the primary variables and through them in the rate of return on capital was not uniform. The effect of the change in some of these factors on the primary variables was independent of the value of other secondary variables. In the case of others, part of the effect was independent while a part depended on the values (or changes therein) of other secondary variables. As a result of this the explanation of the change in the rate of return according to causes became a somewhat complicated task.

6.4. The problem could be seen as stretching in two stages. The first stage was that of estimating the effects of change in different factors on the primary variables bearing on the rate of return on capital. The second stage was that of estimating the effects of changes in these variables on the rate of return.

6.5. The first part of the work was fraught with certain complications on account of two reasons: (1) some of the factors in question did not act independently of each other and (2) the functional relationship between these factors and the primary variables in question, particularly cost and revenue was not of a similar nature.

6.6. Thus, on the cost side, changes in the main factors, the number of buses ( $b_i$ ), the per unit cost ( $c_i$ ) and the intensity of utilisation of vehicles ( $u_i$ ) brought about changes in the aggregate cost both individually and in combination with each other. Similarly, on the revenue side, changes in the factors in question, the volume of output ( $X$ ) the realisation ratio ( $S$ ) and the price ( $P$ ) bore upon aggregate revenue both individually and in combination with each other. We followed the general principle of naming the effect brought about by a factor individually on the dependent variable as the main effect and attributing the effect of the combined operation of the factor to an interaction effect.

6.7. The dichotomy in the mechanics of the operation of the different factors on the cost side and the revenue side lay in the fact that whereas on the cost side, the effect of change in each factor was reflected in the volume of cost directly, on the revenue side, some of them got reflected in a circuitous manner through a change in the volume of output in seat miles. (On the cost side, output was measured in terms of bus miles, while on the revenue side it was measured in terms of seat miles). Thus, the effect of a change in unit cost ( $c_i$ ), number of buses ( $b_i$ ) and utilisation factor ( $u_i$ ) on cost was direct whereas that of a change in ( $b_i$ ) and ( $u_i$ ) and average seating capacity ( $\bar{c}_i$ ) on revenue was registered through a change in total services rendered in seat-miles. As a result of this, the effects of a change in these factors on revenue had to be estimated through a circuitous process, involving first,

the estimation of the changes in the factors in question on output (seat-miles provided) followed by an estimation of the effect of the change in output occurring in this way on the change in revenue.

6.8. On account of these reasons, it became a little difficult to realize the objectives in view with a high degree of mathematical precision. The joint operation of the factors made it difficult to explain the changes in the primary variables as identifiable effects of changes in the factors taken individually. The difficulty was accentuated by the circuitous routes through which the effects of some of the factors on the revenue side had to be estimated. Putting the matter in another way, on account of the complications noted above, changes in the secondary variables which could be positively attributed to changes in the factors in question, taken individually, did not add up to the aggregate change in the secondary variables in question. The explanation for this lay in the obvious fact that theoretically, there was no way by which the joint effects of changes in different factors could be separated into parts which could be attributed to changes in each factor taken individually. Only that part of the change in variables in question, which comprised the main effects of the different factors, could be attributed to the factors in question taken individually. The part accounted for by joint effects could not be attributed to specific factors in operation.

6.9. Proceeding on a mathematically precise method, non-passenger revenue ( $s$ ), fixed capital ( $k$ ), working capital ( $w$ ), and the level of input-prices were the only factors whose total effect on the primary variables determining the rate of return could be unambiguously estimated. As regards others, only part of their effect on the same could be estimated. The incidence of changes in these factors, was reflected in  $\Delta e_i$ ,  $\Delta k_i$ ,  $\Delta w_i$  and  $\Delta h_i$  respectively. The factors  $\Delta P_i$  and  $S_i$ , had a bearing on revenue both individually and jointly, the individual or main effects being represented by  $\Delta P_i S_i X_i$  and  $\Delta S_i P_i X_i$ . The average seating capacity or  $\bar{c}_i$  had a bearing on  $R_i$  indirectly, through its incidence on  $X_i$ . The main effect of  $\bar{c}_i$  on  $X_i$  was given by  $\Delta \bar{c}_i b_i u_i$  and the main effect of  $X_i$  on  $R_i$

was represented by  $\Delta X_i P_i S_i$ . Thereby the main effect of  $\bar{c}_i$  on  $R_i$  could be represented by

$$\frac{\Delta \bar{c}_i b_i u_i}{\Delta X_i} \Delta X_i P_i S_i = \delta_1 \Delta X_i P_i S_i$$

$$\left\{ \text{where } \frac{\Delta \bar{c}_i b_i u_i}{\Delta X_i} = \delta_1 \right\}$$

The factor  $u_i$  had an incidence on cost as well as revenue. Its incidence on cost was represented by  $\Delta u_i c_i b_i$  insofar as its main effect was concerned. Its effect on revenue was, however, a function of the incidence of  $\Delta u_i b_i \bar{c}_i$  (representing the main effects of this factor on output in seat miles) on revenue. Thereby it constituted a part of  $\Delta X_i S_i P_i$  which represented the main effect of  $X_i$  on revenue. As in the case of  $c_i$  it would be given by

$$\frac{\Delta u_i b_i \bar{c}_i}{\Delta X_i} \Delta X_i S_i P_i = \delta_2 \Delta X_i S_i P_i$$

$$\left\{ \text{where } \frac{\Delta u_i b_i \bar{c}_i}{\Delta X_i} = \delta_2 \right\}$$

The main effect of  $c_i$  which had a bearing on cost alone was represented by  $\Delta c_i u_i b_i$ . The factor  $(b_i)$  had an incidence on all the three primary variables determining their rate of return. Its main effect on cost comprised two parts, that on operating cost and that on capital costs. The former was represented by  $\Delta b_i c_i u_i$  and the latter could well be said to comprise the major part of  $\Delta D_i$  and  $\Delta I_i$  (This question is dealt with later on). Its effect on revenue was registered through its effect on output in seat miles, as in the case of  $\bar{c}_i$  and  $u_i$  above. The main effect of  $b_i$  on output was represented by  $\Delta b_i u_i c_i$ , which was a part of the change in  $X_i$ . Thereby the main effect of a change in  $b_i$  on revenue was a part of  $\Delta X_i S_i P_i$ , (represented by, say,  $\delta_3 \Delta X_i S_i P_i$  which in turn, represented the main effect of  $X_i$  on revenue. The main effect of  $b_i$  on  $R_i$  would thus, be given by

$$\frac{\Delta b_i u_i \bar{c}_i}{\Delta X_i} \Delta X_i S_i P_i = \delta_3 \Delta X_i S_i P_i$$

$$\left\{ \text{where } \frac{\Delta b_i u_i \bar{c}_i}{\Delta X_i} = \delta_3 \right\}$$

The change in working capital was represented by  $\Delta w_i$  which reflected in full the effect of this factor on the variable  $k$  i.e., capital.

The incidence of a change in non-passenger revenue and working capital were the only factors which had only one type of effect—the main effect—on the primary variables determining the rate of return on capital. They did not operate in combination with other factors. As such their entire effect on the dependent variables in question could be measured precisely. Other factors had both main effects as well as interaction effects, as a result of which only a part of their total effect on the primary variables could be estimated.

6.10. Looking at the problem from a different angle, of the changes in the secondary variables indicated in the expressions (21), (29), and (31a) above, only a part comprising the following components could be ascribed to changes in the factors in question taken individually:

- (a)  $\Delta S_i P_i X_i$ ,  $\Delta P_i S_i X_i$ ,  $\Delta e_i$  and a part of  $\Delta X_i S_i P_i$  in expression (21)
- (b)  $\Delta c_i u_i b_i$ ,  $\Delta u_i c_i b_i$ ,  $\Delta b_i u_i c_i$ ,  $b_i \Delta D_i b_i \Delta I_i$  and  $\Delta h_i$  in expression (31a), and
- (c)  $\Delta k$  and  $\Delta w$  in expression (37).

The remaining part of the changes which would not be thus explained was

- (a)  $\Delta X_i \Delta S_i P_i$ ,  $\Delta X_i S_i \Delta P_i$ ,  $X_i \Delta S_i \Delta P_i$ ,  $\Delta X_i \Delta S_i \Delta P_i$  and a part of  $\Delta X_i P_i S_i$  in the expression (21), and
- (b)  $u_i \Delta b_i \Delta c_i$ ,  $c_i \Delta u_i \Delta b_i$ ,  $\Delta c_i b_i \Delta u_i$  and  $\Delta c_i \Delta u_i \Delta b_i$  in the expression (31a).

Thus a substantial part of the changes in revenues and costs of the enterprise could not be attributable to changes in individual factors if mathematical precision were to be maintained. However, while mathematical precision was a very important factor to be kept in view, there was no need of regarding it as an end in itself. We found that with a little sacrifice of mathematical precision, we could arrive at reasonably logical results towards the purpose of our inquiry. There could be two alternative ways of approaching the problem.

6.11. Firstly, we could assign priorities among the factors and attribute the unclaimed changes in the primary variables to change in the factors in question accordingly. This, in effect, implied attributing the changes in the secondary variables on account of interaction effects to the factors which were more important than the others in combination with which they were operating. From a purely mathematical view-point there was no justification at all for fixing any system of priorities among the factors. But keeping in view the known objectives of the Corporation, an attempt could be made in this direction.

The obligations of the Corporation, were in the main two-fold. Firstly it had a statutory obligation to expand its services within of course, the constraint of the availability of funds for the purpose. Secondly, it had to provide its services "economically" which implied that it had to make continuous efforts towards reduction of costs of service. Logically, the first obligation could be assigned a higher priority than the second, as the obligation in respect of the former was more definite and unavoidable than that in respect of the latter.<sup>5</sup> Further both these factors could be assigned a higher priority than earning of surpluses, which did not, either technically or in effect, appeared to be an important objective of the Corporation.

The order of importance as indicated above provided a basis for determining the relative priorities among the factors for the purpose in question. As a sequel to the top priority assigned to the obligations of the Corporation in regard to expansion of services,  $b_i$ ; i.e. the no. of buses would be given the highest priority among the factors. The next priority could be given to  $u_i$  or the utilization ratio, which reflected the performance of the Corporation towards effecting economy in the use of a major input-capital. This could be followed by the realisation ratio,  $S_i$  on the revenue side and the cost per bus mile  $c_i$  on the cost side.

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5. Possibly because of difficulties in quantifying the obligation of the Corporation in regard to cost reduction.

6.12. Given this pattern of priorities among the factors, changes in the primary variables in question could be attributed to the different factors in the following way. On the revenue side, all the components of the expression (21) which had  $\Delta X_i$  as one of the multiples could be attributed to  $X_i$ . Of the remaining components, all those having  $\Delta S_i$  could be attributed to the realisation ratio. The responsibility for the rest could be assigned to P or the price-level of services offered for sale. Further, components of the expression (7) having  $\Delta b_i$  as a multiple could be attributed to the factor  $b_i$ . Of the remaining components, those having  $\Delta u_i$  could be attributed to the factor  $u_i$  and the rest to  $\bar{c}_i$ . The interaction effects, both in the analysis of output as well as revenue being thus assigned to one factor or another, the complications created by the fact that the factors  $b_i$ ,  $u_i$  and  $c_i$  had an incidence on  $X_i$  in a circuitous manner were fully resolved. The changes in  $X_i$  being fully explained in terms of changes in  $b_i$ ,  $u_i$  and  $\bar{c}_i$  the entire effect of each of the factors on  $R_i$  could be estimated.

6.13. Thus, considering the factors in the order being observed earlier, the share of  $P_i$  in the change in revenue would be given by  $X_i S_i \Delta P_i$  and that of  $S_i$  by  $X_i \Delta S_i \Delta P_i + X_i \Delta S_i P_i$ . The effect of  $\bar{c}_i$  on  $R_i$  was registered through a change in  $X_i$ . The contribution of  $\bar{c}_i$  to  $\Delta X_i$  was represented by  $\Delta \bar{c}_i b_i u_i$  and the contribution  $\Delta X_i$  to  $R_i$  was comprised of  $\Delta X_i S_i P_i + \Delta X_i \Delta S_i P_i + \Delta X_i S_i \Delta P_i + \Delta X_i \Delta S_i \Delta P_i$ . Representing the latter by  $\mu_x \Delta R_i$ , the effect of  $\bar{c}_i$  on  $R_i$  would be given by :

$$\frac{\Delta \bar{c}_i b_i u_i}{\Delta X_i} \mu_x \Delta R_i = f_i \mu_x \Delta R_i$$

$$\left[ \text{where } f_i = \frac{\Delta c_i u_i b_i}{\Delta X_i} \right]$$

The contribution of  $\Delta x_i$  to the change in  $R_i$  would again be a part of the contribution of  $\Delta X_i$  to the same. The latter being denoted by  $\mu_x \Delta R_i$ , the share of  $\Delta u_i$  in the same would be given by :

$$\frac{\Delta u_i b_i \bar{c}_i + \Delta u_i b_i \Delta \bar{c}_i}{\Delta X_i} \mu_x \Delta R_i = f_i \Delta X_i \mu_x \Delta R_i$$

$$\left( \text{where } f_i \Delta X_i = \frac{\Delta u_i b_i \bar{c}_i + \Delta u_i b_i \Delta \bar{c}_i}{\Delta X_i} \right)$$

The contribution of  $\Delta u_i$  to the change in cost would be given by  $\Delta u_i c_i b_i + \Delta u_i \Delta c_i b_i$ . The effect of  $\Delta c_i$ , the change in per unit cost would consist of  $\Delta c_i b_i u_i$  only. The contribution of the factor  $b_i$  to  $\Delta R_i$  would, as in the case of  $\bar{c}_i$ , and  $u_i$ , be a part of the contribution of  $\Delta X_i$  to  $\Delta R_i$  viz.,  $\mu_x \Delta R_i$ . The entire share of  $b_i$  to  $\Delta X_i$  would be  $\Delta b_i \bar{c}_i u_i + \Delta b_i \Delta \bar{c}_i u_i + \Delta b_i \bar{c}_i \Delta u_i + \Delta b_i \Delta \bar{c}_i \Delta u_i$ . Representing the latter as a fraction of  $\Delta X_i$ , by  $f_2 \Delta X_i$ , the contribution of  $b_i$  to  $R_i$  would be given by  $f_2 \Delta X_i \cdot \mu_x \Delta R_i$ . The contribution to  $\Delta c_i$  would be reflected partly in the change in the operational cost and partly in the change in capital cost. The former would be represented by  $\Delta b_i c_i u_i + \Delta b_i \Delta c_i u_i + \Delta b_i c_i \Delta u_i + \Delta b_i \Delta u_i \Delta c_i$ , while the latter would be measured by  $\Delta D_i + \Delta I_i$ . And its contribution to  $k$  would be reflected in  $\Delta k_i$ . The share of  $w$  in the change in total capital would be given by  $\Delta w_i$ , while the effect of variation in input-prices on cost would be reflected in  $\Delta k_i$ .

6.14. This method of estimating the contributions of the factors to the primary variables could, as pointed out above, by no means be claimed to be mathematically precise. As such, strictly speaking, the share of the different factors in the changes in the primary variables could not be attributed to the changes in the factors in question. (This would not, of course, apply to the case of those factors, the incidence of which on the dependent variables did not involve interaction effects). However, although it would not be correct to envisage a cause and effect relationship between the two, we could certainly say that the major responsibility for the share of each factor in the changes in the primary variables thus estimated was borne by the factor in question. Taking the case of  $b_i$  again, the incidence of  $\Delta b_i$  on cost as assessed by this method could not strictly be said to be caused by  $\Delta b_i$  but it could reasonably be said that the additional cost thus attributed to  $\Delta b_i$  was on additional buses added to the fleet of the Corporation between year  $i$  and year  $i+n$ .

6.15. The other method of resolving the problem could be to assign to each factor not only its main effects but also all the inter-action effects of the factor in question with other factors. In this way each factor, having an immediate bear-

ing on the primary variables would be associated with all the components in the expressions (21) and (31a) in which the change in the factor in question appears as a multiple.

6.16. Considering the factors in the same order as before, the effects of the different factors, as estimated by this method would turn out to be as follows (indicated by arrows):

$e_i \longrightarrow \Delta e_i$ , on revenue

$P_i \longrightarrow \Delta P_i X_i S_i + \Delta P_i \Delta X_i S_i + \Delta P_i X_i \Delta S_i + \Delta P_i \Delta X_i \Delta S_i$ ,  
on revenue

$S_i \longrightarrow \Delta S_i P_i X_i + \Delta S_i \Delta P_i X_i + \Delta S_i P_i \Delta X_i + \Delta S_i \Delta P_i \Delta X_i$ ,  
on revenue

$X_i \longrightarrow \Delta X_i \Delta S_i P_i + \Delta X_i S_i \Delta P_i + \Delta X_i S_i P_i + \Delta X_i \Delta S_i \Delta P_i$   
 $= \pi_i$ , say, on revenue

$C_i \longrightarrow$  part of  $[\Delta X_i S_i P_i + \Delta X_i \Delta S_i P_i + \Delta X_i \Delta P_i S_i$   
 $+ \Delta X_i \Delta P_i \Delta S_i]$ , on revenue

$u_i \longrightarrow$  part of  $(\Delta X_i S_i P_i + \Delta X_i \Delta S_i P_i + X_i \Delta P_i S_i$   
 $+ \Delta X_i \Delta P_i \Delta S_i)$  on revenue  
 $\Delta u_i b_i c_i + \Delta u_i \Delta b_i c_i + \Delta u_i b_i \Delta c_i + \Delta u_i \Delta b_i \Delta c_i$ ,  
on cost

$c_i \longrightarrow u_i \Delta c_i b_i + \Delta u_i \Delta c_i b_i + u_i \Delta c_i \Delta b_i$ , on cost

$b_i \longrightarrow$  part of  $(\Delta X_i S_i P_i + \Delta X_i \Delta S_i P_i + \Delta X_i \Delta P_i S_i$   
 $+ \Delta X_i \Delta P_i \Delta S_i)$ , on revenue

$\Delta D_i + \Delta I_i$ , on capital costs

$\Delta b_i u_i c_i + \Delta b_i \Delta u_i c_i + \Delta b_i u_i \Delta c_i + \Delta u_i \Delta b_i \Delta c_i$ ,

on operating cost

$w_i \longrightarrow \Delta w_i$ , on working capital

Input-prices  $\longrightarrow \Delta h_i$ .

The contribution of each of the factors  $u_i$ ,  $b_i$  and  $\bar{c}_i$  to change in revenue could be estimated as follows:

6.17 If the contribution of factors  $u_i$ ,  $\bar{c}_i$  and  $b_i$  to  $\Delta X_i$  were denoted by  $\alpha_i$ ,  $\beta_i$  and  $\gamma_i$  respectively, from equation (6)

$$\alpha_i = \Delta u_i \bar{c}_i b_i + \Delta u_i \Delta \bar{c}_i b_i + \Delta u_i \bar{c}_i \Delta b_i + \Delta u_i \Delta b_i \Delta \bar{c}_i$$

$$\beta_i = \Delta \bar{c}_i u_i b_i + \Delta \bar{c}_i \Delta u_i b_i + \Delta \bar{c}_i u_i \Delta b_i + \Delta \bar{c}_i \Delta b_i u_i$$

$$\gamma_i = \Delta b_i \bar{c}_i u_i + \Delta b_i \Delta \bar{c}_i u_i + \Delta b_i \bar{c}_i \Delta u_i + \Delta b_i \Delta u_i \bar{c}_i$$

and if the contribution of  $X_i$  to  $R_i$  were represented by  $\pi_i$  the contribution of  $u_i, \bar{c}_i, b_i$  to  $\Delta R_i$  would be given by  $\frac{\alpha_i}{\Delta X_i} \cdot \pi_i$ ,

$\frac{\beta_i}{\Delta X_i} \cdot \pi_i$  and  $\frac{\gamma_i}{\Delta X_i} \cdot \pi_i$  respectively.

6.18. In contrast to the first method (given in Section 6.9) the disadvantage of this method lay in the fact that the sum of the effects of different factors on each of the primary variables so attributed would add up to a figure higher than the change in the variable in question. This was obviously a result of the fact that several components of the expressions (21) and (30), representing interaction effects were attributed to two or three factors simultaneously. That way, it resulted in a considerable degree of overlapping between the effects attributed to the different factors in question.

6.19. The latter two methods of attributing the changes in the primary variables to the factors (in Section 6.11 and Section 6.16) were obviously lacking in mathematical precision; they could, however, be useful for assessing the relative importance of the steps taken by the management to further its objectives. That way, they could be useful for formulating the policies of the enterprise as well.

6.20. The second stage of the task, as stated above, consisted of determining the contribution of the different factors to changes in the rate of return on the basis of their effects on the primary variables. Here again, it was not possible to maintain mathematical precision. The test of a mathematically precise method would be that the changes in the rate of return attributed to each factor should add up to the total change in the rate of return. Putting this a little differently, a method could be regarded as precise only if it was capable of explaining the changes in the dependent variables in such wise that the effects attributed to the different factors were unique and added up exactly to the total observed change. This, we discovered, was impossible to achieve.

6.21. The reason for this was very simple. There was only one method of determining the effect of any factor on the rate of return and that was by taking the difference between the return without the operation of the factor in question and the return emerging after the operation of the factor. Thus if the factor  $f$  brought about a change of  $d\bar{R}_i$  in net revenue and  $dk_i$  in capital then its effect on the rate of return would

be measured by

$$\frac{\bar{R}_i + d\bar{R}_i}{K_i + dK_i} = \frac{\bar{R}_i}{K_i} = \text{say, } d\phi$$

Now, if there were  $n$  factors, whose effects on the rate of return as estimated by the above method were  $d\phi_1, d\phi_2, d\phi_3$  etc. it would be easy to see that the sum of these would not be equal to the observed change in the overall rate of return, i.e.,  $(d\phi_1 + d\phi_2 + d\phi_3 + \dots + d\phi_n)$  would exceed  $\left\{ \frac{\bar{R}_{i+n}}{K_{i+n}} - \frac{\bar{R}_i}{K_i} \right\}$ .

6.22. There was only one way of getting out of this situation and that was to assign an order of priority among the factors and measure the effects of each factor after all the factors, having a priority over it, had exercised their effects on the rate of return. The effects of the different factors determined in this manner would then add up to the overall change in the rate of return on capital.

Thus, in case there were three factors  $F_1, F_2$ , and  $F_3$  and priorities were assigned among them in the above order and if the effects of these on  $\bar{R}_i$  and  $K_i$  were represented by  $d\bar{R}_{1i}, d\bar{R}_{2i}$ ,  $dR_{3i}$  and  $dK_{1i}, dK_{2i}$  and  $dK_{3i}$  respectively, the effect of  $F_2$  on the rate of return would be given by

$$\frac{\bar{R}_i + d\bar{R}_{1i} + d\bar{R}_{2i}}{K_i + dK_{1i} + dK_{2i}} - \frac{\bar{R}_i + d\bar{R}_{1i}}{K_i + dK_{1i}}$$

Similarly the effect of  $F_3$  on the rate of return would be given by

$$\frac{\bar{R}_i + d\bar{R}_{1i} + d\bar{R}_{2i} + d\bar{R}_{3i}}{K_i + dK_{1i} + dK_{2i} + dK_{3i}} - \frac{\bar{R}_i + d\bar{R}_{1i} + d\bar{R}_{2i}}{K_i + dK_{1i} + dK_{2i}}$$

6.23. This method, however, suffered from one important limitation. The effect of any factor on the rate of return, as determined on the basis of this method would depend upon the place that the factor in question occupied in the scheme of priorities in respect of the different factors. Thus the contribution of any factor to the overall change in the rate of return measured by this method, would not be the same if it were given the first place in the scheme of priorities laid down for the purpose, rather than, say, the third or the last place.

And since, there was no valid basis for preferring one scheme of priorities over the other, the results obtained by adopting any scheme of priorities were open to the charge of arbitrariness.

6.24. Keeping the above in view, we did not take recourse to assigning priorities among the factors for the purpose in view and adopted the method indicated in Section above. Corresponding to each method of attributing the changes in the secondary variables resultant upon changes in factors in set of results in regard to the effects of the different factors on the rate of return were obtained. Expressed in symbols, the incidence of the different factors on the rate of return, following the first of the three methods of determining factor-effects on the primary variable discussed in this section earlier were given by

$$\begin{aligned}
 e_i &\rightarrow \left\{ \frac{\bar{R}_i + \Delta e_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 P_i &\rightarrow \left\{ \frac{\bar{R}_i + \Delta P_i S_i X_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 S_i &\rightarrow \left\{ \frac{\bar{R}_i + \Delta S_i P_i X_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 \bar{c}_i &\rightarrow \left\{ \frac{\bar{R}_i + \delta_1 \Delta X_j S_i P_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 u_i &\rightarrow \left\{ \frac{\bar{R}_i + \delta_2 \Delta X_i S_i P_i - \Delta u_i c_i b_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 c_i &\rightarrow \left\{ \frac{\bar{R}_i - \Delta c_i u_i b_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 b_i &\rightarrow \left\{ \frac{\bar{R}_i + \delta_3 \Delta X_i S_i P_i - (\Delta b_i c_i u_i + b_i \Delta D_i + b_i \Delta I_i)}{K_i + \Delta K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 w_i &\rightarrow \left\{ \frac{\bar{R}_i}{K_i + \Delta w_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 \text{Input prices} &\rightarrow \left\{ \frac{R_i - \Delta h_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\}
 \end{aligned}$$

(arrows indicating effects)

6.25. On the basis of the results given by the second method of attributing the factors-effects on the primary variables, (in Section 6.11), the effects of the different factors on the rate of return were given by:

$$\begin{aligned}
 e_i &\longrightarrow \left\{ \frac{\bar{R}_i + \Delta e_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 P_i &\longrightarrow \left\{ \frac{\bar{R}_i + X_i S_i \Delta P_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 S_i &\longrightarrow \left\{ \frac{\bar{R}_i + X_i \Delta S_i P_i + X_i \Delta S_i \Delta P_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 \bar{c}_i &\longrightarrow \left\{ \frac{\bar{R}_i + \delta_1 \mu_x \Delta \bar{R}_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 u_i &\longrightarrow \left\{ \frac{\bar{R}_i + f_1 \Delta X_i \mu_x \Delta \bar{R}_i - (\Delta u_i c_i b_i + \Delta u_i \Delta c_i \Delta b_i)}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 c_i &\longrightarrow \left\{ \frac{\bar{R}_i - \Delta c_i b_i u_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 b_i &\longrightarrow \left\{ \frac{\bar{R}_i + f_2 \Delta X_i \mu_x \Delta \bar{R}_i}{K_i + \Delta K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 w_i &\longrightarrow \left\{ \frac{\bar{R}_i}{K_i + \Delta w_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 \text{Input prices} &\longrightarrow \left\{ \frac{\bar{R}_i - \Delta h_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\}
 \end{aligned}$$

6.26. Similarly, the factor contributions of the secondary variables estimated on the basis of the third method (in Section 6.16) the following results in regard to the incidence of the factors on the rate of return:

$$\begin{aligned}
 e_i &\longrightarrow \left\{ \frac{\bar{R}_i + \Delta e_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\} \\
 P_i &\longrightarrow \left\{ \frac{\bar{R}_i + \Delta P_i X_i S_i + \Delta P_i \Delta X_i S_i + \Delta P_i X_i \Delta S_i}{K_i} \right. \\
 &\quad \left. + \Delta P_i \Delta X_i \Delta S_i - \frac{\bar{R}_i}{K_i} \right\} \\
 S_i &\longrightarrow \left\{ \frac{\bar{R}_i + \Delta S_i P_i X_i + \Delta S_i \Delta P_i X_i + \Delta S_i P_i \Delta X_i}{K_i} \right. \\
 &\quad \left. + \Delta S_i \Delta P_i \Delta X_i - \frac{\bar{R}_i}{K_i} \right\}
 \end{aligned}$$

$$c_i \longrightarrow \left\{ \frac{\bar{R}_i + \frac{\beta_i}{\Delta X_i} \pi_i}{K_i} - \frac{\bar{R}_i}{K_i} \right\}$$

$$u_i \longrightarrow \left\{ \frac{\bar{R}_i + \frac{\alpha_i}{\Delta X_i} \cdot \pi_i - M}{K_i} - \frac{\bar{R}_i}{K_i} \right\}$$

(where  $M = \Delta u_i c_i b_i + \Delta u_i \Delta b_i c_i + \Delta u_i b_i \Delta c_i + \Delta u_i \Delta b_i \Delta c_i$ )

$$c_i \longrightarrow \left\{ \frac{\bar{R}_i - N}{K_i} - \frac{\bar{R}_i}{K_i} \right\}$$

(where  $N = u_i \Delta c_i b_i + \Delta u_i \Delta c_i b_i + u_i \Delta c_i \Delta b_i + \Delta u_i \Delta b_i \Delta c_i$ )

$$b_i \longrightarrow \left\{ \frac{\bar{R}_i + \frac{\gamma_i}{\Delta X_i} \cdot \pi_i - G - (\Delta D_i + \Delta I_i) b_i}{K_i + \Delta K_i} - \frac{\bar{R}_i}{K_i} \right\}$$

(where  $G = \Delta b_i u_i c_i + \Delta b_i \Delta u_i c_i + \Delta b_i \Delta c_i u_i + \Delta b_i \Delta u_i \Delta c_i$ )

$$w_i \longrightarrow \left\{ \frac{\bar{R}_i}{K_i + \Delta w_i} - \frac{\bar{R}_i}{K_i} \right\}$$

## 7. Concluding Notes

7.1. Estimates of factor-effects arrived at on the basis of the above methods turned out to be fairly revealing. With the basic objective of the measurement of the management's performance, the factors were classified into two categories: (1) those, the changes in which could be attributed to the management's own initiative, and (2) those which were outside the control of the management. Most of the factors were fairly distinguishable as belonging to one category or the other.

The realisation factor ( $S_i$ ), the utilisation factor ( $u_i$ ), operational cost per unit of service offered at constant prices ( $c_i$ ), and working capital ( $w_i$ ) could well be regarded as belonging to the first category. The rest comprising the level of bus-fares ( $P_i$ ), non-passenger revenue ( $e_i$ ) average seating capacity ( $c_i$ ), the number of buses ( $b_i$ ) and

the capital invested ( $K_i$ ) could be put in the second category.<sup>5</sup> An additional factor belonging to this category was the change in cost on account of changing input-prices.

7.2. The contribution of each of the factors to the change in the rate of return between consecutive years from 1959-60 to 1964-65 were estimated, following each of the methods mentioned in Section 6. The effects of the factors falling in the first category were then summed up to provide a measure of the contribution of the management to the change in the rate of return on capital between consecutive years. The sum of the effects of the remaining factors provided a measure of the variation in the rate of return on account of factors beyond the control of the management.

7.3. The aforementioned estimates provided an explanation of the change in the rate of return in each year over the previous year in terms of the factor effects. This did not, however, provide an indication of the same over a number of years. Comparison over longer periods necessitated further treatment of the data.

To this end, we first estimated the extent to which the rate of return in each year showed a variation from the same in each of the previous years (excepting the immediately preceding year) covered in our study. This was followed by an estimation of the share of each of the factors in the variances in the rate of return so estimated. Here again, three sets of

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5. The categorization of the factors in this manner was, of course, not very precise and scientific and yet it was sufficiently valid and justifiable for the objective in view. Some of the factors belonging to the first category could well be vastly influenced by purely accidental factors. Thus, a general public unrest emanating from, say, student indiscipline might well influence the utilisation factor or cost per unit of service offered materially. On the other hand, some of the factors, belonging to the second category, e.g., the level of non-passenger revenue could well be said to depend upon the effectiveness with which the management was performing its functions, and could thereby be identified as falling within the range of managerial discretion. On the whole, however, keeping in view the extent of Government's control over the activities of the Corporation, the categorization of factors as above was fairly realistic and meaningful.

final results were obtained by using the three methods given in Section 6 above. The next step was that of aggregating separately the effect of factors within the control of the management and that of factors outside the control of the management on the rate of return. The way in which the factors were distributed in the two categories for this purpose was the same as indicated in 7.1 above.

7.4. The results obtained from our analysis were fairly dependable and meaningful, for assessing the contribution of the management to the change in the profitability of the Corporation and thereby; to a certain extent, the performance of the management as such. Although the method used by us could not be claimed to be faultless, the results therefrom corresponded fairly well to what was apparent from a casual observation of the finances and the operation of the Corporation. Thereby we could get an indirect evidence of the extent to which the methodology used by us was suitable for the purpose in view.

## PRICING IN PUBLIC ENTERPRISES: SOME ADMINISTRATIVE ASPECTS

### 1. Some Basic Considerations

The basic objectives that the pricing policy of public enterprises should serve are mainly three: first, it should help a rational allocation of scarce resources, secondly, it should ensure an optimal utilization of the available resources; and lastly it should promote the growth of the economy. The Government of India had been particularly emphasizing the last of the above objectives of pricing.

The question of pricing of the products of public enterprises is inevitably linked up with the market situation in which they are operating. The main types of market situations in which public enterprises may be operating are as follows:

(a) **Competitive Markets.** The enterprises operating under competitive conditions may be further classified into three broad sub-categories: (1) those which have to compete with suppliers within the country; (2) those which are exporting their products, and are thereby competing in foreign markets; and (3) enterprises facing competition from imports.

(b) **Monopoly Situations.** The enterprises falling in this category include the statutory monopolies as well as monopolies by reason of temporary absence of other producers in the industry.

(c) **Oligopolistic Situations.** (Characterised by a small number of sellers.) Such market situations may be further subdivided into two categories according to whether other enterprises in the industry belong to the public sector or the

private sector.

(d) Markets characterised by limited number of buyers or one buyer only. Under competitive conditions the prices which the products of public enterprises would be able to fetch in the market would tend to ensure both a rational allocation and an optimal utilisation of scarce resources. The profit earned by the enterprise under competition tends to show the marginal productivity of capital invested in the enterprise<sup>1</sup> and thereby provides a guideline for further investments. Further, a policy of maximisation of profits under these conditions would ensure an optimal utilisation of the existing capacity in the sense that the pursual of such a policy would result in maximisation of aggregate benefit<sup>2</sup> from the productive activity of the enterprise. Further it would, ipso facto, ensure the maximal utilisation of the growth potential of the enterprise in terms of earning of surpluses.

In the case of enterprises having a significant monopoly power, it is difficult to define the guidelines to pricing in such precise terms. For, under these conditions, there may be occasions for a conflict between the different objectives as outlined above. Thus, a price policy intended to ensure maximisation of the aggregate benefit generated by the productive activity of the enterprise, may not be the same as the policy aimed at showing the marginal productivity of capital invested in the enterprise. Aggregate benefit would be maximised by producing an output at which marginal cost is equal to price, while the marginal productivity of capital would be shown by the profitability of investment at the optimal level of output. Further, the policy intended to maximise the surpluses earned by the enterprise may be entirely different from either of the two above.

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1. In the present context, the marginal productivity of capital is taken to be indicated by the profit earned by the enterprise at optimum output.

2. Aggregate benefit in the present context implies the total utility generated by the enterprise which, in turn, would be given by the aggregate area under the relevant part of the average revenue curve of the enterprise.

A detailed theoretical analysis of the question of pricing in monopoly type public enterprises would show that policy making in this respect is basically one of laying down priorities regarding the various objectives which the referent policies are intended to serve.<sup>3</sup> From a logical viewpoint, the following order of priorities may be suggested:

- (1) The enterprise should not run into losses. This is of particular significance in those cases in which the enterprise suffers from excess capacity.
- (2) The enterprise should try to maximise the benefits arising from its productive activity. This is of special importance for public utilities.
- (3) The enterprise should maximise its surpluses, without resorting to output restriction.

As a matter of fact there need not be an inevitable conflict between the last two objectives. The objective (2) implies extending the output of the enterprise to a level at which marginal cost is equivalent to price. The objective (3) implies extending the output beyond the optimal point in such measure as to maximise the surplus earned by the enterprise. In many cases it should be possible for the enterprise to maximise its surpluses while producing the output indicated by objective (2). In so far as there is a conflict between the two, a suitable compromise may be effected keeping in view the overall objectives regarding mobilisation of surpluses.

Excepting the conditions of excess capacity the crucial issue in determining the price policy of this category of enterprises, therefore, would turn out to be one of choosing a level of output between two limits: the capacity or the optimal out-

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3. In the ultimate analysis the question of pricing policy veers round certain value judgments about the objectives which the public enterprises are expected to further in the economy. The basic assumption underlying the analysis in this paper is that one of the most important objectives of pricing policy of public enterprises in India is generation of surpluses for developmental purposes. The justification for making this assumption lies in the policy declarations made by the Planning Commission on this question.

put on the one hand, and the level of output at which marginal cost is equal to price, on the other. In case the enterprise is suffering from excess capacity, the compulsion of satisfying the minimal commercial criterion of covering costs with revenues might necessitate restriction of output below the optimal level.

In between the two extremes of the competitive and monopoly situations, there may be other market situations, characterised by varying degrees of the competitive and monopoly elements. One such situation may be that of oligopoly in which there are a few sellers competing with each other so that the price policy of each individual unit has a bearing on that of others. Another may be one in which the enterprise may be confronted with a small number of buyers or one buyer only. Yet another possibility is that of monopolistic competition in which there are a large number of buyers and sellers, the latter differentiating their products by such means as advertising and branding.

In the case of oligopoly and monopolistic competition, the public enterprise need not follow a different policy than what it should have done if it were a monopoly which means that it need not follow a policy of output restriction simply to augment its surpluses. The market situation of restricted number of buyers may result in higgling and bargaining between the enterprise and its buyers which in turn would tend to make it difficult to generalise about the overall consequences of a price policy.

Under competitive or semi-competitive (like oligopolistic or monopolistic) conditions, the enterprises having lower costs would be able to make larger profits than others. This might be considered undesirable for strategic reasons particularly if the enterprises having a comparatively advantageous position are in the private sector. Further, under conditions of overall scarcity the pattern of distribution of the product emerging from the free interplay of the market forces may not be regarded as in national interest. In such cases, there may be a case for controlling the prices as well as the distribution of the product in question. In the event of such control being

exercised, the price policy of the enterprise would not be determined independently; it would be a part of the overall price policy for the industry as a whole. Under such "administered" system of prices, the position of the enterprise will be the same as under perfect competition and, as a corollary, following the priorities discussed above, the level of output which the enterprise should aim at producing under these conditions would be that at which the marginal cost is equal to price.

## 2. The Existing Position

The market situations in which public enterprises are working in India at present are various. Quite a number of enterprises are operating in fairly competitive markets, competition being either from indigenous producers or from imported products or from both. For instance the Hotels Corporation of India and the Hindustan Salts, compete with private indigenous concerns; the Air India, the Hindustan Machine Tools and the Indian Oil Corporation have foreign competitors and the Bharat Electronics, the Moghul Lines, etc., are in competition with both. At the other end, there are numerous cases of enterprises operating under monopoly conditions. The electricity and transport undertakings, the Indian Airlines Corporation and the railways are statutory monopolies while a few undertakings like the Heavy Electricals, the Bharat Heavy Electricals and the Hindustan Antibiotics and the Hindustan Shipyard are monopolies by reason of absence of competing indigenous producers in the same industry and lack of imports of the commodities in question from abroad. The Hindustan Steel, the Fertilizer Corporation of India, and the National Coal Development Corporation may be regarded as enterprises operating within an oligopolistic framework of market. Examples of enterprises operating in monopolistic markets may be provided by the Ashoka Hotels, and the Air India International. A few enterprises like the National Mineral Development Corporation, the Indian Telephone Industries and the Hindustan Teleprinters have to deal with a small number of buyers as a consequence of which the market condition in which they are operating approximates to that of higgling and bargaining.

There is considerable evidence to show that the price policies of the public enterprises are significantly conditioned by the market situation in which they are operating. Most enterprises operating in competitive markets fix their prices in line with the ruling prices of the commodities in question in the market. In case the competing enterprises are foreign, the landed cost of imported products is generally adopted as the basis for price fixation. In the case of enterprises which are monopolies or possess a very significant degree of monopoly power, prices are fixed on the cost plus basis. This implies that the prices of products of these enterprises are fixed in such manner as to bring in a certain margin of surplus over aggregate cost to the enterprise by way of revenue.<sup>4</sup> A few notable examples of enterprises adopting this method for price fixation are the Hindustan Aircraft, Indian Telephone Industries and the Bharat Electronics. Often the surplus objective is determined in relation to the aggregate investment in the enterprise in question. But in some cases like the Hindustan Cables and the Bharat Electronics the aggregate turnover, given by the aggregate cost, forms the basis for the same.

The enterprises operating under oligopolistic framework of market follow more or less the same approach towards pricing as the monopoly type enterprises. Usually, however, such market situations are oligopolistic only in structure; the element of competition inherent in an oligopolistic situation is generally conspicuous by its absence from them.

Often the potential competition between the enterprises operating in such markets is done away with by introducing some system of administered prices. The market situation in the steel and fertilizer industry and to some extent coal could possibly have been oligopolistic but for the Government control over the prices of the products of these industries. The rationale for this may be said to lie in (a) the relative scar-

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4. As a matter of fact, the majority of enterprises in the public sector have adopted this principle of pricing. The important public utility undertakings like electricity and transport corporations fix their tariffs on the cost plus basis.

city of the products in question, (b) the desire of the government to prevent the private enterprises in the industry from making what it regards as unreasonable profits, (c) the anxiety of the Government to protect the financial interests of enterprises operating at high capital (or even operational) costs, and (d) the anxiety of the Government to ensure the supply of the products of the industry to users at reasonable prices.

Under conditions of monopolistic competition, the public enterprises are guided by more or less the same set of considerations as are the private enterprises insofar as pricing is concerned. This inevitably implies concern for covering their costs by their earnings as far as possible. As a matter of fact, at present there are very few public enterprises which may be said to be operating under this type of market condition and often wherever conditions are like that, the environment of overall scarcity of their products or services, tends to reduce the rigour of competition they have to face.<sup>5</sup>

In the few cases of the market condition of higgling and bargaining, the enterprises in question do not seem to have a definite pricing policy. The prices of the products of these enterprises tend to be determined by the relative bargaining strength of the buyers and sellers. It appears that on the whole buyers are able to dictate their terms to these enterprises.<sup>6</sup>

### 3. Defects in Policies

Broadly speaking pricing in public enterprises operating in competitive markets satisfies the overall objectives of pric-

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5. Thus in many cities, the Government dairy and poultry farms are ostensibly operating in competition with private suppliers of same or identical products. But the total availability of the commodities in question is usually insufficient to meet the total requirement, as a result of which competition between the different producers tends to become notional rather than genuine.

6. The National Mineral Development Corporation has been complaining about its inability to secure suitable prices for its products from the Minerals and Metals Trading Corporation. Similarly, the Heavy Electricals have the feeling of not receiving proper treatment from some of the Electricity Boards.

ing characteristic of commercial undertakings. The force of competition compels them to make continuous endeavours towards reduction of costs and expand their output to the optimal level. The losses incurred by them, if any under such conditions may well be an index of their inefficiency.<sup>7</sup>

The above is not, however, true of the enterprises working in monopoly or oligopolistic situations. A major defect in their pricing policy arises from the emphasis on surpluses rather than the level of output in fixing their prices. The conditions of monopoly and the relative scarcity of products make it possible for them to attain their surplus objectives at less than optimal output.<sup>8</sup> How far these enterprises actually take resort to output restriction, it is difficult to say. But to the extent to which this happens the surpluses earned by the enterprises would not show the marginal productivity of the capital invested in them. Further, this approach towards pricing works against the possible use of the price mechanics for ensuring operational efficiency. It is true that several enterprises are now taking steps towards using sophisticated techniques of cost control and management accounting to this end,<sup>9</sup> yet it can hardly be denied that the price policy can play a significant role in this direction.

Secondly, the policies often suffer from a multiplicity of objectives, and a wrong assessment of the inter-relationship between these objectives. An important—and, in the present context, perhaps the most important—objective of pricing is the generation of surpluses, but this objective has, in several cases, been modified or ignored in favour of some other objec-

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7. Thus the losses incurred by such enterprises as Khadi Gramodyog Boards in various States may well be attributed to both operational inefficiency and inefficiency of investment.

8. An illustrative case of earning of surplus along with output restriction is provided by the Bihar Road Transport Corporation. The Corporation was earning surpluses for a number of years (1959-60 to 1961-62) even though its capacity was not utilised to the optimum level. The Fertilizer Corporation of India provides another example.

9. Examples are the Fertilizer Corporation of India, the Hindustan Steel Ltd., and the Chittaranjan Locomotive Factory. The Fertilizer Corporation has been particularly keen in this respect.

tives without a detailed consideration of the extent of conflict between the two.<sup>10</sup> Possibly, the authorities taking the relevant decisions have been guided more by convention than a detailed study of the issues involved.<sup>11</sup>

Thirdly, in a number of cases, especially public utilities and transport, apparently irrational policies are being followed in the name of public interest.<sup>12</sup> It would be difficult to gainsay that public enterprises should function in public interest and that they should not have the narrow aim of earning profits as private enterprises have. Nevertheless, it should be possible to rationalise its meaning and define its content more precisely than what has been done so far.

Fourthly, there is a remarkable lack of uniformity between the principles on the basis of which the surplus targets of the enterprises are determined. In the light of what has been stated above, the very method of fixing prices on the basis of a predetermined surplus target would appear to be wrong. But if a strategy like that is followed, it would be desirable to have at least a uniform set of principles for the same. The lack of uniformity is reflected both in the bases over which the surplus targets are determined and the prin-

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10. Perhaps the best example of this is provided by the pricing of fertilisers. The Government has for long been keeping the prices of fertilizers low in relation to what might have been an equilibrium price, possibly with the objective of keeping the commodity within the reach of the users. In a situation of scarcity, this has led to the emergence of complex problems of distribution, without in any way contributing towards a more effective or rational use of the product in question.

11. A rather remarkable illustration of how conventions bear upon the formulation of important policies is provided by the approach of the Tariff Commission to the fixation of prices in public sector undertakings. In determining the rate of return on capital permissible to public enterprises, the Tariff Commission is broadly guided by the profit margins allowed to the comparable cases in the private sector, or the current rate of return on investments in general in the economy, rather than a detailed analysis of the issues involved.

12. Nationalisation of uneconomic routes by the road transport undertakings in the public sector and extension of power lines to unremunerative areas could provide interesting illustrations of this.

ciples for determining the margins over the bases. Thus as pointed out above, while generally the capital invested in the enterprise forms the basis for fixing the surplus targets, in certain cases it is the aggregate cost of the enterprise which is adopted as the base for the purpose. Further, the method of estimation of aggregate capital itself is not uniform being, block capital in some cases and subscribed capital in the case of others.<sup>13</sup> In the case of enterprises operating in an oligopolistic framework of markets, lack of uniformity in the bases of pricing is evidenced in a somewhat different dimension. In the case of steel uniform retention prices based on the costs of one enterprise and that a private enterprise: the TISCO—is paid to all the enterprises. In the case of fertilisers, on the other hand, the price payable to each enterprise is determined individually on the basis of its realised costs.<sup>14</sup>

As regards enterprises operating in markets of the last category characterised by higgling and bargaining pricing of their products lacks any focus whatsoever. And this is quite natural since they cannot plan about their prices with a view to achieving specific ends. This has an effect on their output policies as well which tend to become haphazard as an inevitable consequence of the uncertainty associated with their financial plans.

#### 4. Implementation of Policies

Notwithstanding the above defects there is a certain measure of direction in the pricing policies of the public enterprises insofar as they do generally intend to make surpluses.

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13. The Tariff Commission has been adopting the capital block for purposes of fixation of prices. The "capital block" in the case of the Sindri Fertilizer Factory was taken as equivalent to (1) the subscribed capital of the Company plus working capital estimated at four months' cost of production. In contrast to this surplus objectives of the Bihar Road Transport Corporation are determined on a capital base represented by the subscribed and paid up capital of the enterprise.

14. In fact, one of the major complaints voiced by the representatives of the Hindustan Steel to the Study Team was that the basis of price fixation in the Iron and Steel Industry is unfavourable and unjust to the public sector.

The implementation of these policies, irrespective of the quality of their content, is however, seldom satisfactory. This is reflected in the fact that quite often the financial results projected on the basis of certain prices of the products of these enterprises are not realised.<sup>15</sup>

In the main the failures in achieving the anticipated results in this regard may be ascribed to three factors: (1) defective planning of prices, (2) lack of adequate knowledge of the inter-relationships between the different variables on which the results expected from the prices planned for a given period depend, and (3) lack of timely action to ensure that the anticipated results are realised.

The prices expected to be realised during any accounting period should be realistic in nature in the sense that they should be such as can be realised during the period in question. A realistic projection of prices would naturally necessitate a realistic projection of the different variables on the basis of which prices are determined on the one hand, and a realistic estimate of the likely demand conditions during the period in question, on the other. The principal end results of prices as reflected in the financial results of the enterprise are a function of a number of variables which in turn may be a function of a number of other secondary variables. Unless the relationship between these variables among themselves, on the one hand, and that between these variables and the overall end results of pricing are precisely known, it would be difficult to guard against the consequences of unexpected changes in these variables on the overall financial results. Lastly, in order to take timely corrective action to ensure that the anticipated results are realised, the enterprise should have a built-in system by which the management at the top level is informed of what is happening and advised in regard to the action that needs to be taken.

The procedure by which the pricing in the public enter-

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15. A very good example of this is provided by the Bihar Road Transport Corporation in which the gap between anticipated and realised profits during some recent years has run into up to 10 per cent of the subscribed and paid up capital of the Corporation.

prise sector on the cost plus basis is being done at present is, by and large, as follows. Prices are fixed in advance of the accounting period (usually the financial year) at the time of the preparation of the budget for the year in question. The method adopted for this is more or less like this. The aggregate output of the enterprise during the ensuing period is first estimated. This provides the basis for estimating the aggregate costs during the period in question. In the case of some enterprises, e.g., the Chittaranjan Locomotive Factory and the Fertilizer Corporation of India certain standards or norms of usage of inputs are used for arriving at this estimate. Usually, however, historical costs, i.e., costs incurred in the current year or the previous year are used for arriving at the estimates in question. A margin of surplus estimated as a percentage of the capital invested or aggregate turnover is then added to the aggregate costs thus arrived at for getting the total amount to be collected by way of revenue. This divided by the aggregate expected output gives the price per unit of output.

There are few enterprises in the case of which adequate care is being taken to ensure that the relevant aggregates for projecting the prices are realistic. In the case of the Fertilizer Corporation of India the prices of which have for a long time been determined in consultation with the Tariff Commission, some measure of sophistication is observed in this regard. The approach of the Tariff Commission is fairly meticulous and it takes into consideration both the historical records of performance and the special factors that might have a bearing on these aggregates during the price-period, i.e., the period for which prices are fixed.

But generally the public enterprises use rather crude methods in estimating these variables. Mostly the past results in regard to performance are projected into the future with broad modifications to incorporate the effects of changes in capacity. For example, a rather common variable whose effect on these aggregates is ignored is the price level. Changes in the price level inevitably have a significant bearing on the level of cost and thereby the realised level of surpluses.<sup>10</sup>

As regards the second point, the study of the inter-relationships between the different variables bearing on the end-results of pricing, i.e., surpluses,—it appears that the public enterprises have not so far given sufficient attention to this aspect of pricing. It is true that many public enterprises do possess a statistical unit with them to collect facts about their operational performance.<sup>17</sup> Similarly records regarding finances and costs are also maintained. But how far they are used for the purpose in question is difficult to say. To take a few concrete cases, the statistical unit of the Bihar State Electricity Board, does collect a lot of information about the operations of the enterprise. But the information so collected is seldom used by them to explore why the enterprise has been incurring "unplanned" losses. The same is true of the Bihar Road Transport Corporation which has been incurring losses year after year since 1964-65 even though it has been budgeting for profits in each year.

As regards the last point, public enterprises do have some system of financial control, but more often than not, there is no co-ordinated action to ensure that the overall budgeted results are realised.<sup>18</sup>

In a major way, this may be attributed to the inability of the top management to obtain information in sufficient details and covering the aspects as indicated above. But to a significant extent this may also be accounted for by the delays in the communication of operational results to the top manage-

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16. To take an example, the costs of the Bihar Road Transport Corporation have been almost to continuously increasing since 1962. But it did not make any provision for it in budgeting its costs and revenues, with the result that its realised surpluses are falling short of the expected surpluses almost continuously since 1962-63.

17. A few major undertakings having statistical units are: The Indian Oil Corporation Ltd., Export Credit and Guarantee Corporation Ltd., Hindustan Steel Ltd., and the National Coal Development Corporation Ltd.

18. The available information indicates that few enterprises have even rudimentary system of management accounting. One notable exception seems to be the Neyveli Lignite Corporation Ltd.

ment from the lower levels in the management hierarchy.<sup>19</sup> Unless the top management is informed of the quality of the performance of the enterprise and the related matters at the time when things are actually happening, it would not possibly be able to take corrective action to ensure that the expected results are realised. Delays in communication have an adverse effect on both the formulation and implementation of policies.

### 5. Administrative Factors Accounting for Defects in Policies

To a significant extent the defects in the pricing policies may be attributed to the administrative constraints under which they are formulated. The relationship between the Government and the enterprises on this question is rather very complex. Apparently, barring a few exceptions like the electricity undertakings, the Government has left the enterprises completely free in the matter of pricing. A study of the enabling statutes of the 6 major corporations and the articles of association of 47 Government companies shows that apparently, the Government has left the enterprises almost entirely free in the matter of pricing. There is virtually no reference to the question of pricing in them.

Yet in a majority of cases, the Government does exercise a significant amount of explicit or implicit control over the pricing policies of these enterprises, and one of the important aspects of pricing over which the control of the Government extends is that of earning of surpluses. There is considerable evidence to show that in many cases the Government lays an explicit or implicit obligation on the enterprise to earn a certain amount of surplus. The obligation is most explicit in those cases in which prices are fixed by, or in consultation with, the Government, for in such cases the Government

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19. To take a rather extreme kind of example, in the case of the Bihar State Road Transport Corporation, the compilation of the operational and financial results of the enterprise taken about one year so that the management comes to know about them much after the accounting period to which they relate has elapsed.

makes an explicit allowance for it in fixing the prices.<sup>20</sup> Even if there are no explicit obligations of this kind, the Government representatives on their control boards are not averse to conveying the wishes of the Government to them on this question which has an almost compulsive effect.<sup>21</sup> Further, the general policy announcements by the Planning Commission on these questions from time to time tend to be taken as policy directives by these enterprises.

The keenness of the Government to ensure that the public enterprises are earning surpluses is seldom accompanied by an equal measure of keenness to ensure that they are following the right kind of output policy. As a result of this, there is no particular anxiety on the part of the enterprises to produce at the optimal level of capacity, nor are they keen to reduce their costs by improving their technical efficiency.<sup>22</sup> Keeping in view the fact that the majority of enterprises do

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20. The replies given by the public enterprises to the questionnaire issued by the Study Team revealed that in the majority of the enterprises pricing is done either explicitly by the Government or in consultation with the Government. As a matter of fact, there is not much of a difference between fixation of prices by the Government and that in consultation with the Government. In either case, the Government has the final say. (Concrete instances of enterprises, which fix their prices in consultation with Government, are provided by the Hindustan Cables Ltd., the Neyveli Lignite Corporation Ltd., and the Bihar State Road Transport Corporation.

21. In the course of the interviews by the author, of some top managerial personnel in public enterprises, it came out that the senior government officials represented on the control boards of public enterprises do not always maintain a clear distinction between their role as a government official and that as a member of the top decision making body in the enterprise.

22. In the course of his evidence to the Study Team on Public Undertakings, Shri M.S. Rao, Chairman of the Hindustan Steel Ltd., laid particular emphasis on this point. Explaining the two aspects of cost reduction, by fuller utilisation of existing capacity and by improvements in the usage of inputs he alleged that instead of trying to reduce costs by efficient use of resources, public sector enterprises, anxious to secure a return of 10 to 12 per cent expected of them by the Planning Commission and the Government, try to load it on to their prices, sometimes, without reference even to their own production efficiency and almost invariably without thought about the consequences that would follow.

possess a fairly significant degree of monopoly power the Government's concern for their financial results should be accompanied by an equivalent measure of concern for their output policy as well. Of course, it is true that under the existing market conditions, a step in this direction need not ensure economical usage of resources, but it would certainly contribute towards a better utilisation of capacity.

There is a further aspect of the Government's engagement with this matter, which acts as an added factor to complicate the situation. There are cases of public enterprises operating under vague constraints in regard to pricing, the interpretation of which is more or less left to the management. Thus the road transport undertakings are expected to provide 'economical' and "efficient" services to the people.<sup>23</sup> What exactly is meant by 'economical' is left to the management of the enterprise to decide presumably in consultation with the State Government concerned. Vague policy directions of this kind lead to an atmosphere of confusion in the formulation of policies, as the management is not quite confident of moving in any direction. In some ways, it might be better to leave the management entirely free than to give them vague and confusing directions. To a large extent, the lot of avoidable irrationality in pricing policies on considerations of public interest may be attributed to this factor. As has been stated in a previous section, public interest is undoubtedly an important consideration bearing on the pricing policy of public enterprises. But lack of clarity in regard to its content has often led to remarkably inconsistent policies.

A very good example of this is provided by electricity and transport undertakings. Public electric supply undertakings are generally expected to provide power at concessional rates to the agricultural sector. Further, in some States, massive investments are being planned for supplying power to the industrially backward areas, where the likelihood of growth of industry is apparently very meagre; whereas the areas with potentiality for industrialisation are likely to face

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23. The Road Transport Corporation Act, 1960; Chapter II, para 3.

shortage of power.<sup>24</sup> Such decisions are hardly based on a rational calculation of the costs and benefits involved. As for nationalised transport, price differentials between different categories of routes are seldom based on a rational calculation of the differential costs. To a certain extent, of course, threadbare correspondence between fares and costs in such services is inadvisable on grounds of the inconvenience that it would cause. But much of the presently existing discrepancy between the two may be attributed to some concern for public interest.<sup>25</sup>

In the case of enterprises dealing with a relatively small number of buyers, absence or distortion of policy results from an absence of compulsion on the part of buyers to give a fair deal to the sellers. The same may be said about the sellers, if their side is stronger than that of the buyers. In all those cases, in which the market condition is such as to give rise to an occasion for higgling and bargaining, rationality in pricing policy can be ensured through some kind of compulsion, or through mutual agreement between the parties concerned. At present, there is a complete lack of the administrative machinery needed to resolve the problem in either way. To a limited extent, such problems are being tackled by

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24. In this context, the following extract from the Annual Financial Statement of the Bihar State Electricity Board for 1964-65 is very relevant:

"Unlike private undertakings, the Board does not confine its activities to places where the demand is concentrated and investment is profitable. Although it is primarily tended to be a profit-making organisation on a modest scale, it has to be alive to its social obligations. It has, therefore, to undertake, within acceptable limits electrification of the rural areas with a view of giving facilities even in the remote villages for the promotion of small scale industries, irrigation facilities, etc. In these areas, however, it takes a long time before the load develops but the expenditure on maintenance is appreciable almost from the very start".

The investment made by the Board in rural electrification during the Third Plan period aggregated Rs. 363.00 lakhs.

25. The available statistics on the operation of the Bihar State Road Transport Corporation show that town services are almost invariably uneconomical. Yet the Corporation has been reluctant to increase the fare for these services.

the administrative ministries concerned. But, on the whole, the matter is left to be thrashed out between the sellers and buyers themselves.

#### 6. Administrative Factors Responsible for Defects in Implementation of Policies

The most important factor to be taken into account in this context is the inadequate appreciation of the urgency in regard to earning of profits on the part of the management of public enterprises. Notwithstanding the Government's explicit or implicit intention to earn an adequate return on its investments, there is virtually no assessment of the performance of the management in the light of the financial results of the enterprise. The chief executives of public enterprises or, for that matter, the members of their control boards, have no personal stake in the financial performance of the enterprise and somehow they are not being rewarded or punished for how the enterprise performs on the financial front.

Much of the difficulties in the way of a proper planning of prices can be attributed to the absence or inadequate staffing of the economic and statistical units in these enterprises.<sup>26</sup> Whatever statistical units they have are generally over busy filling up and sending the numerous proforma of reporting to the administrative ministries. Broadly, it may not be too far from the truth to say that the economic and statistical units within the enterprises are used more to keep the outside individuals or organisations informed about the working of the enterprise than to keep the management of the enterprise itself informed of the same.

The available information indicates that in most enterprises statistical units are virtually treated as unnecessary appendages to the organisation.<sup>27</sup> They are not expected to

26. Out of the 42 Central Government undertakings which responded to the questionnaire issued by the Study Team, only 11 were having statistical units with them. Even among these, there were only a few which could claim to have developed their units to a level which would enable them to undertake tasks of a serious nature.

27. The replies to the questionnaire circulated by the Study

play any important part in the formulation and implementation of policies—a fact which stands in strange contrast to private undertakings which are now increasingly realising the necessity of obtaining the help and advice of qualified economists and statisticians in formulating their policies.

Alongwith it is a lack of co-ordination between the statistical, planning and budgetary units within the organisations, as a result of which not unoften the different sections are not fully aware of the work being done by other sections, and are not of much help to each other.<sup>28</sup> The planning units which most enterprises have are entrusted with the task of formulation of both long term and short term programmes of output and investment, while the budgeting sections bear the responsibility for preparing the annual financial estimates of income and expenditure. Obviously, in order to be able to plan in a realistic manner, the unit in charge of it must have detailed statistical information about the operations of the enterprise. Similarly, the unit in charge of budgeting must have full knowledge of the behaviour of costs and revenues in response to changes in output. But not unoften these administrative units within the enterprise work with the spirit of a clear cut demarcation between their jurisdictions and responsibilities.<sup>29</sup>

*(Continued from Previous Page)*

Team provide an indirect evidence of this. No enterprise made even the barest reference to its statistical unit while discussing the role of its various administrative units (e.g., budget and accounts section) in the implementation of its policies.

28. Out of the 11 Central Government undertakings which are having statistical units (please see footnote 26 on page 108), in the case of only one—the Fertilizer and Chemicals (Travancore) Ltd.—there appears to be some co-ordination between the work of the Accounts and the Statistical units.

29. To take a concrete illustration, in the case of the Bihar State Road Transport Corporation, the budget section does not bother much to draw upon the statistical and planning sections to obtain necessary information for sound budgeting. In a rather strange way, while the preparation of cost and revenue estimates for the existing services is a charge of the budget section, it is the planning section which prepares the relevant estimates relating to new services (expansion). The statistical section is concerned only with post mortem collection of information, without having much to contribute in the preparation of either the physical or financial programmes of the enterprise.

In some measure, the failures of the public enterprises in making precise estimates of the relevant aggregates for profit planning may be attributed to absence of perspective planning. Many enterprises do prepare some kind of estimates of expansion in future, in fulfilment of the requirements in this regard by the parent ministries in the Central or State Governments (as the case may be) and the Planning Commission. But these estimates are generally of a fairly broad nature, giving a bare outline of the expansion schemes and the amount of investment planned for the future. For one reason, they can hardly be taken as a sufficiently reliable and stable basis for formulating concrete programmes of operations, which is that the programmes of investment have to be approved on an annual basis, first by the administrative ministry concerned and then by the Parliament or the State legislature in the case of public corporations.

Further, the general approach to budgeting and financial control that most enterprises have at present is not conducive to the implementation of their pricing policies. Barring a few notable exceptions like the Chittaranjan Locomotive Factory, the approach to budgeting is generally oriented towards the juridical control over expenditure rather than a control over operations. The budgets of the State Government corporations are in particular more or less patterned on the budgets of the Government. A number of public enterprises do not prepare detailed budgets at all, a notable example being the Hindustan Cables Limited. This limited approach towards budgeting stands in the way of their taking steps towards relating the financial results of the enterprise available from the periodical reviews of incomes and expenditures to the operational results. And unless they do that they would not be able to take corrective measures to ensure the realisation of the objectives of their pricing policies.<sup>30</sup>

#### 7. Suggestions for Reforms on Administrative Questions

In the first place, it is necessary to streamline the relations between the Government and enterprise on questions re-

<sup>30</sup> This point has been dealt with in greater detail in a paper on "Budgeting in Public Enterprises" by the author.

lating to pricing. As stated above much of presently existing muddle and confusion in regard to pricing in public enterprises may be traced to the inadequacy of the Government's role in providing guidance to the public enterprises on this question.

The question may be asked whether it would be better to leave the enterprises completely free in regard to price and output policies. The answer would obviously be in the negative. There is every reason for the Government having control over such an important matter as pricing. Thus, it is legitimate on the part of the Government to exercise control over the pricing policy of the public enterprises. But the control thus exercised should be rational and consistent with the overall expectations from public enterprises.

As a first step in this direction, the Government should indicate the financial obligations of public enterprises in more specific terms. In the last two Plans, no statement was made on the return expected on the capital employed in the public enterprise sector, although they did indicate the expected contribution of public enterprises to plan resources in overall terms. In the Fourth Plan (draft outline), credit has been taken for generation of surpluses amounting to Rs. 1,085 crores from public enterprises. The document does not, however, give an undertaking-wise break-up of this total; nor does it provide a clear statement of the manner by which this total is arrived at. It does make a mention of the desirability of obtaining a rate of return of 11 to 12 per cent on the capital invested in public enterprises. But sufficient care has not been taken to define the term capital employed and specify the method of calculation of the rate of return thereon. The Government should explicitly specify the general financial and economic obligations of public enterprises indicating output and pricing policy that the public enterprises operating in different industries and market situations should follow.

In addition to this, the Government should provide a "financial framework" to each enterprise indicating, *inter alia*, the following:

- (a) the output and pricing policies that the enterprise should follow;
- (b) the norms for the determination of the cost-bases for fixation of prices;
- (c) the bearing of public interest on the formulation of pricing policies; and
- (d) the distribution of responsibility for interpretation of public interest between the Government and the management of the enterprise.

If generation of surpluses constitutes a major objective of the pricing policy of public enterprises, it would be better if the Government confined its directives to the management of the enterprise to output policies, leaving the prices to be fixed by them in accordance with the market situation. This should be particularly helpful in the case of monopoly type enterprises. As a matter of fact, the greater the emphasis on generation of surpluses, the greater would be the need for giving freedom to the management in the matter of pricing. Of course, in the case of public utilities like electricity and transport it would be neither advisable nor possible to leave the question of pricing entirely to the management of the enterprise. But in other cases, including the enterprises in intermediate goods industries, it should be possible to adopt this policy.

The obligations of the enterprise in regard to output policy may, in general, emphasize the production of full capacity output. The profits earned by the enterprise at full capacity output would show the marginal productivity of capital invested in the enterprise. At the same time they would represent the maximum amount of surplus that the enterprise can generate without resorting to output restriction.

One possible disadvantage in leaving the prices to be determined by the management of the enterprise may be that, in that case, there would be no explicit compulsion on the management to keep a watch on its costs. One way in which this problem may be tackled would be to prescribe some general norms regarding costs in the "financial framework"

laid down by the Government. If the "financial framework" is not expected to cover that much of details, it may, at least, indicate the methods on the basis of which such norms can be determined. Alongwith this, it may contain an additional provision that the excess of the actualised costs over the normative costs would be deducted from the surpluses earned by the enterprise and surrendered to the Government as a kind of fine, unless there are some special circumstances beyond the control of the management to justify this excess.

Public interest becomes a significant factor in pricing policy only in case it comes into conflict with the normal commercial obligations of the public enterprises. As far as possible the Government should take upon itself the responsibility for defining what constitutes public interest and specify the same in the "financial framework" within which the enterprise is expected to operate. In particular, it should indicate the extent to which the enterprise should sell at less than cost of production on considerations of public interest. In case some amount of discretion is permitted to the management in the matter of interpretation of public interest, it should be left open to it to seek explicit sanction from the Government for the steps taken by it in this direction.

Thirdly, there is need for a greater measure of uniformity on the procedures relating to pricing. For this, it would be necessary to ensure, on the one hand, that each enterprise knows about what others are doing and, on the other, that the Government takes into account facts about the working of not only the enterprise in question, but also other enterprises in the public sector. This would incidentally help the estimation of the overall financial obligations of public enterprises in more concrete terms.

Fourthly, the internal organisational structure of the public enterprises needs to be rationalised with a view to improving both the formulation and implementation of policies. Each enterprise should be required to set up an economic and statistical department and a management accountancy cell within this department. As far as practicable the administrative units in charge of budgeting, planning and statistics

should be placed under the charge of the same administrative head—preferably, the Financial Adviser or the Chief Accounts Officer in order to secure adequate co-ordination between their work.

Lastly, steps should be taken to ensure greater co-ordination between the pricing policies of enterprises which are inter-dependent on each other in a significant way. The problem of inter-undertaking disputes is going to increase as the existing units go into production and new units are set up. At the moment, such disputes are being resolved, to some extent, through lengthy correspondence and discussion between different administrative Ministries. The available evidence, however, shows that the existing procedures are rather inadequate to meet the requirements of the situation.

It has for some time past been suggested that a permanent administrative organisation (usually designated as the Central Price Commission) should be created both to serve as a central pool of information on the working of the public enterprises and as an agency for arbitrating on the disputes between them on financial matters. It appears that generally speaking, the public undertakings are averse to the setting up of such an organisation. The general apprehension is that an organisation of this type would tend to assume control functions, which would impinge upon the autonomy of public enterprises.

As a matter of fact, there is hardly an adequate justification for creating a new organisational machinery for giving effect to the suggestions made above. On the one hand, the functions of some of the existing organisations dealing with public enterprises may well be suitably modified and expanded to serve the many of the objectives which a new organisation like the Central Price Commission would serve. The setting up of the Commission would rather result in an unnecessary duplication of the organisational machineries capable of handling identical-kind of tasks.

Thus the task of collecting information on the financial policies and procedures may be entrusted to the Bureau of Public Enterprises in the Ministry of Finance of the Gov-

ernment of India. To a certain extent it may also provide the necessary guidance to the Government as well as the public enterprises on matters relating to pricing policy. Being situated in the Ministry of Finance it may reasonably be expected to command sufficient respect to enable it to function as a clearing house of information and as an agency for guiding the authorities concerned on technical matters.

On the other hand, it is difficult to see how an administrative agency like the Central Price Commission would contribute towards securing better co-ordination between the price policies of different enterprises. The administrative implications of the problem would depend upon whether the enterprises in question are controlled by the same Government or by different Governments. Cases of conflict between the interests of enterprises operating under the same Government—Central or State—can be effectively tackled by the Government concerned. The Government inevitably reserves powers to issue directives to public enterprises established by it. The Government would, therefore, always be in a position to straighten out the disputes between the enterprises established by it with a certain measure of finality.

Problems of co-ordination of this category need not, therefore, necessitate the creation of a statutory administrative body exclusively devoted to this task. Each case of dispute may be taken up on an ad hoc basis and dealt with by a committee on the recommendations of which the Government may issue necessary directives to the enterprises concerned. In case, however, such cases occur frequently, the Government may create a permanent committee (e.g., the committee of secretaries) to deal with these questions. One advantage in creating a standing committee for the purpose may be that it might ensure a greater measure of "fairness" in the decisions taken on such issues.

Co-ordination between the policies of enterprises set up by different Governments, may not, however, be as easy to secure. Disputes between them may well develop into inter-Government disputes. It is difficult to see how an element of compulsion can be brought about in resolving these dis-

putes. In the ultimate analysis, the only way in which such problems can possibly be resolved is by mutual agreement between the parties concerned.

Yet, some kind of organisational framework may be of help for a proper appreciation of the issues in question by the parties concerned. The administrative agency dealing with the question would have to command the confidence of the parties concerned. This, in turn, implies that it would have to be created with the consent of the parties concerned and further that the composition of the Committee must be such as to represent the various interests involved. An administrative agency created by the Central Government is not likely to satisfy this requirement.

One such organisation to which cases of this kind could be referred might be the already existing Zonal Councils. It is doubtful, however, if the Zonal Councils, possess sufficient technical competence to undertake tasks of this nature. Keeping in view the nature of the problem it would obviously be advisable to refer them to more specialised administrative agencies.

There are two other alternatives which may be considered in this regard. One is the creation of a standing committee of officials. A standing administrative organisation on which the interests of the Governments as well as enterprises are represented, may, however, become too big to work effectively. The other alternative is that of creating an *ad hoc* committee to deal with each problem as and when it arises. This seems to be a better device than the former. The main advantages of adopting this procedure would be two-fold. Firstly, it would make it possible to get each problem examined by persons most competent to do the job. Secondly, it would help quick disposal of cases. Much, however, would in any case depend upon the mutual goodwill and understanding between the contending parties.

# BUDGETING IN PUBLIC ENTERPRISES : A CRITICAL APPRAISAL

## 1. Introduction

Budgeting is both a management philosophy and an instrument of action. It enables "all those in an organisation who are responsible for the use of resources to project their ideas into the future, and concurrently to look back to see how performance compared with premise and intentions".<sup>1</sup>

Basically, it emphasises two aspects of the management function: the functions of planning and control. The importance of these two functions of management in the context of the administration of business cannot be over-emphasized.

For some time past, the budgetary practices of public enterprises have been subjected to extensive criticism. The Estimates Committee of the Lok Sabha has not been quite satisfied with the existing position in this regard.

In its 20th Report (Second Lok Sabha) the Committee recommended that the public undertakings should prepare a performance and programme statement for the budget year together with the previous year's statement. It further recommended that these enterprises should be encouraged to prepare business-type budgets. These recommendations were reiterated by the Committee in its 73rd Report (Second Lok Sabha). The Government gave an assurance to the Committee to take necessary steps in this direction. But it is difficult

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1. Quoted from an unpublished note on this subject by Mr. P.L. Tandon, Chairman, Hindustan Lever Limited.

to say if adequate progress has been achieved in this direction so far. The question deserves a detailed examination.

## 2. The Existing Position

As an instrument of planning and control of operations, the aspects of the existing budgetary practices that merit special attention are (a) the period for which budgeting is done, i.e., the "time-span" of budgeting; (b) the magnitudes in respect of which budget estimates are prepared, i.e., the 'coverage' of budgeting; and (c) the mechanics of budgetary controls.

**2.1. The Time Span.** Most public enterprises in India do not prepare budgets covering a period of more than one year. As such the use of budgeting as an aid to forward planning is rather limited in the public enterprise sector. It is true that these enterprises do prepare a kind of perspective plan at the interval of every five years, on the eve of the preparation of the national Five-Year Plans. The circumstances in which these plans are prepared are more or less compulsive in nature, insofar as the basic objective behind the preparation of the same is to fulfil the obligation placed on the enterprises in this regard by the Planning Commission and the Government. The scope of these plans (which may be better described as "programmes") is, however, limited covering the expansion of capacity and thereby aggregate output. Further, the methodology used for making projections of the relevant aggregates, e.g., marketable output, is rather crude.<sup>2</sup>

On the whole, budgeting in public enterprises is more or less on an annual basis. Expenditure on capital account during the budget year is determined keeping in view the constraints of availability of funds from the Government about which information is usually communicated to them beforehand. Estimates of revenue expenditure are prepared on the basis of (a) past year's results, and (b) the likely effects of

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2. Of course, in the case of major industries, the "plans" of the enterprises are based on the relevant projections made by the Planning Commission. But the reliability of the Planning Commission estimates, themselves, may be questionable and to that extent "planning" in public enterprises would be open to criticism.

the fruition of expansion of capacity proposed to be effected during the budget year.

**2.2 Coverage and Scope.** The coverage of budgeting is reflected partly in the constituents of the budget and partly in the type of classification that is followed. The public enterprises may be placed into three categories from this point of view.

In the first place, there are a few like the Chittaranjan Locomotive Factory, the Bharat Electronics Limited, and the Heavy Engineering Corporation which prepare fairly detailed budgets. The budget of the Heavy Engineering Corporation (HEC for short)<sup>3</sup> apart from incorporating summary statements of receipts and expenditures in the revenue account and capital account, also gives the programmes of production, revenue and expenditure in each of the major units of production. Thus detailed budgets are prepared for the Foundry Forge Unit, the Heavy Machine Building Project, the Heavy Machine Tools Project, and also the Jagannathnagar Township. Besides, a summary of common charges for the Corporation as a whole is also provided.

The budgets of these enterprises broadly satisfy the objectives of performance budgeting as well as business budgeting. By showing the distribution of investment expenditure by end-results and that of costs by the major constituents of the product-mix, they satisfy the main objective of performance budgeting which is to show the distribution of expenditure by end results. By relating the budgeted financial results of the enterprise to the operations and achievements of the enterprise in physical terms, they go a fairly long way towards meeting the requirements of business budgeting. Of course, as pointed out at a later stage, they are by no means very near to what could possibly be done in these respects yet they contain elements of performance as well as business budgeting.

In the second category may be put the enterprises which prepare budgets which while being fairly detailed, are framed

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3. For the year 1965-66.

on what may be called as the traditional pattern. The principal magnitudes in regard to which projections are made are more or less confined to expenditure and receipts in financial terms. To this category would belong the budgets of most public utilities and transport undertakings. The budget of the Bihar State Road Transport Corporation<sup>4</sup> can be taken as an illustrative case in this regard. The Corporation's budget comprises summary and detailed statements of expenditure and receipts in the capital and the revenue account and a few explanatory tables giving the details of the totals under some important heads in the above statements (e.g., Funds, Deposits and Advances).

The classification of expenditure in the revenue account is first according to the functional categories in which the operations of the Corporation have been divided, e.g., "Traffic (Operational)" and "Workshop and Maintenance". The aggregates under each of these categories are further detailed in an object-wise distribution.

The classification of expenditure in the capital budget of the Corporation is broadly object-wise, aggregate expenditure being distributed between "land", "building", "electrical installations", etc.

Broadly, the system of classification of expenditure adopted in the budgets of the enterprises belonging to this category does not show expenditure by activities and end results and as such does not conform to the objectives of performance budgeting. Further, budgeting in these enterprises is limited in scope and coverage, being largely confined to what may be called "planning of expenditure". It does not underline the overall objectives of the enterprise and the inter-relationships between the various parts of the activities of the enterprise as production and sales. Thereby, it fails to approximate to the requirements of business budgeting.<sup>5</sup>

4. For the year 1965-66.

5. The above is by no means intended to suggest that the enterprises belonging to this category do not plan their activities in non-financial terms. The estimates of expenditure, and receipts  
(Continued on next page)

In the last category may be placed those enterprises which prepare very short budgets. Examples of such enterprises are provided by the Hindustan Machine Tools, the Hindustan Cables and the Hindustan Photo Films Company. The budget of the Hindustan Cables,<sup>6</sup> a rather clumsy document, is broadly comprised of a revenue budget, a capital budget and a ways and means statement. Expenditure on revenue account is shown in two ways, according to the major objects of expenditure, e.g., 'raw materials', wages and salaries, and according to the major departments of the enterprise. A tentative forecast of profit, based on the estimates of revenue and expenditure included in the budget is also included as part of the revenue budget. Receipts on the revenue account are detailed according to the sale proceeds from the various items produced by the Corporation. Expenditure on capital account is shown in three parts: (a) carry over items, (b) new items, and (c) current expansion project. A separate statement showing the distribution of aggregate capital expenditure between the different departments of the enterprise is also provided. Receipts on the capital account are shown in the overall ways and means statement as well as in a separate statement showing the sources from which the funds would be forthcoming. Apart from the above, the budget incorporates statements giving the details of totals of receipts and expenditure under some important subheads in the revenue budget such as Miscellaneous Expenses, Sale Realisation, etc.

The budget of the Hindustan Photo Films Manufacturing Company<sup>7</sup> is again broadly consisting of three parts, viz., (i) capital budget, (ii) revenue budget, and (iii) ways and means budget. Expenditure on the capital account is classified according to the major objects of expenditure, e.g., "plant

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are prepared on the basis estimates of physical targets of services to be provided and the likely costs of the same in physical terms. But the budgets by themselves do not indicate the programming in physical terms and the relationship of the financial estimates with the programmes formulated in physical terms.

6. For the year 1965-66.

7. For the year 1966-67.

and equipment", "land and buildings" and "township". This type of classification obviously does not show expenditure by major end-results. The classification of expenditure in the revenue budget (summary) is also broadly by the major objects of expenditure, e.g., raw materials, direct labour, transport, etc. The ways and means budget provides an account of the likely financial position of the company taking into account both the revenue and the capital budgets. Classified in this manner, the statement of expenditure fails to show the distribution of the costs incurred by the enterprise either by the responsibility centres or by the main components of the product-mix.

The wide variations in the classifications as well as the scope of budgeting indicate that the public enterprises are not guided by a uniform set of principles or objectives in preparing their budgets. Further, it appears that taking the public enterprise sector as a whole, steps are just beginning to be taken towards introducing a sophisticated budgetary system, much ground being yet to be covered in this direction.

**2.3. Budgetary Controls.** Most enterprises do have a system by which the top management is kept informed of the progress achieved in the various targets set in the budget. The extent to which the budget itself provides the basis for management information and reporting depends, for obvious reasons, on the coverage and scope of budgeting.

In the case of those enterprises the budgets of which have a fairly detailed coverage, reporting in respect of the quantities incorporated in the budget keeps the management informed of the achievements and failures of the enterprise in the different facets of its activities. The budgetary practices in the Fertilizer Corporation of India as well as the Bharat Electronics provide ample evidence of this. The budgets of these enterprises incorporate details regarding production and sales targets and the management is kept informed of the achievements in respect of these at regular intervals during the budget period. The reporting is usually on a monthly basis, supplemented by a quarterly assessment of performance against the budgeted estimates.

The position in respect of the enterprises which confine their budgeting to financial aggregates is slightly different. In the case of these, reporting in respect of the aggregate included in the budget provides the top management with only a partial assessment of how the enterprise is faring. The financial aggregates are, of course, generally, based on the relevant estimates in physical terms, but as they are not taken into account explicitly in budgeting, reporting in respect of budgeted quantities does not provide an account of the extent to which they are being realised.

However, many enterprises which otherwise confine their budgeting to more or less financial aggregates do have some system of management reporting in respect of physical targets, although it does not form part of their budgetary process. To take the familiar case of the Bihar Road Transport Corporation, even though the reporting with reference to budgeted quantities is on the whole confined to progress of expenditure, the management is separately informed about the position in respect of operational performance, e.g., services provided, realised load factor, breakdowns, etc. In fact most public enterprises, irrespective of their approach to budgeting, have taken significant measures towards developing a system of management reporting, as revealed by the studies made by the COPP Management Group in this regard,<sup>8</sup> and the information collected by the Administrative Reforms Commission.<sup>9</sup> A few notable undertaking covered by the COPP Management Group in its studies are the Indian Airlines Corporation, the Indian Telephone Industries and the Delhi Transport Undertaking. The Indian Airlines Corporation, for instance, has adopted a very extensive system of management reporting which provides for a continuous inflow of information on

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8. A note on Management Reporting in Public Enterprises (unpublished); prepared by the COPP Management Group, Planning Commission, Government of India.

9. The material collected by the Administrative Reforms Commission is comprised of: (a) replies to the questionnaire circulated to public undertakings by the Study Team on Public Undertakings of the Commission; (b) memoranda submitted to the Study Team by individuals and organisations, and (c) evidence given by officials before the Study Team.

almost all operational matters to the top management. The same could be said to be more or less true of some other enterprises covered in these studies, e.g., the Indian Telephone Industries and the Delhi Transport Undertaking.

### 3. Deficiencies in the Existing System

An important deficiency of the existing budgetary practices in public enterprises is the absence of a sufficiently long perspective. The one year period for which budgets are prepared is often too short and does not provide an adequate basis for planning its operations. Related to it in some respects is the crudity in the methods for making the relevant estimates. The undue emphasis placed on historical factors for making projections for the future may to a certain extent be attributed to the short period perspective that the management has in view in preparing the budgets of these enterprises. With a longer perspective in view the management would be under greater pressure to be more precise in making the relevant estimates (e.g., of expected returns from investment) for the purposes of budgeting.

The major deficiencies in budgeting, however, arise from the fact of limited coverage and the traditional or object-wise classification in the budgets of most public enterprise. The absence of the details of various important aggregates relating to the operation of the enterprise impairs the potentiality of the budgetary mechanism as an instrument of communication and control. As a result of the absence of an explicit inclusion of the details regarding the constituents of the various aggregates included in the budget the interactions of unforeseen changes in one variable on others are not immediately apparent. This in turn stands in the way of taking timely decisions about the right course of action directed to safeguard the overall interests of business. The object-wise classification tends to blur and possibly misdirect the focus of control by implicitly putting emphasis on realisation of targets in respect of expenditure rather than the purposes or end-results for which expenditure is incurred.

It is possible that if the management had a built-in

organisational framework for an efficient and timely analysis of the data reported to it, the inhibitory effects of budget form on communication and control over operations could be neutralised. The data flowing to the management on different facets of its operations could have been analysed to show (a) whether changes in the parametric conditions, if any, necessitated a recasting of the budget, and (b) whether the realised results corresponded to the budget estimates, and if not, what precisely were the reasons for that.<sup>10</sup>

At present public enterprises do not however, seem to have evolved a system by which such an analysis is made. Many enterprises just do not have the organisational framework and the expertise needed for the purpose. The replies given to the questionnaire issued by the Administrative Reforms Commission to the public undertakings indicate that out of 43 Central Government Undertakings only 12 have such statistical units which judged by their own standards, can be regarded as satisfactory.<sup>11</sup> Even those enterprises which do have some kind of an organisational set up for the purpose, by way of statistical units, hardly make an endeavour in this direction. The situation, as it exists at present, is that in most enterprises data on financial and non-financial matters are fed to the management by different agencies, the former usually by the budget section and the latter by the functional heads of the departments and the task of drawing inferences from them is almost entirely left to the top management, which, obviously, cannot possibly spare sufficient time for the same.

#### 4. Some Basic Factors Behind the Existing Deficiencies in Budgeting

The budgetary practices in public enterprises have evolved from that in the Government and this is perhaps the most

10. The point has been discussed in some detail in the paper on "Appraisal of the Management's Performance in Public Enterprises" written by the author.

11. Some of the notable public undertakings which just do not have statistical units are Indian Drugs and Pharmaceuticals Ltd., and the Moghul Lines Ltd.

important factor accounting for the deficiencies therein. The approach and philosophy behind government budgeting (or to be more precise, the traditional type of budgeting) still lingers in the budgetary practices of public enterprises. The coverage and scope as well as the classification of receipts and expenditure adopted in the budgets of public enterprises reflect the impact of traditional budgeting in varying degrees.<sup>12</sup> The focus of traditional type of budgeting is mainly on control of expenditure, the objective being to ensure that the expenditure actually incurred does not exceed the amount for which authority for spending has been obtained. There is, no doubt, a good deal of justification for this approach, but that is not the kind of approach which would be suitable for public enterprises. For, in the case of commercial undertakings, planning and control of expenditure as such has no special significance. Expenditure constitutes a means to achieve certain ends which would equally depend upon several other variables the most important of which may be the revenue receipts or, to be more precise, the sale proceeds of the enterprise.

But historical factors apart, the deficiencies of the existing budgetary system may, to a significant extent, be attributed to the fact that the objectives which the management is expected to pursue, are themselves often not very clear. For instance, the management of the enterprise is seldom adequately clear about the obligations of the enterprise in respect of the output to be produced or the rate of return to be earned on capital.<sup>13</sup> As a matter of fact, there is considerable measure of diffusion in the authority for decision making

12. The Budgetary practices of the Bihar Road Transport Corporation provide a good example of this. Budget preparation in the Corporation is strictly based on explicit government directives in that regard. Of course, the obligation on the enterprise to prepare its budget in a certain manner for presentation to the Government does not prevent the enterprise from having a more sophisticated and operationally useful system of budgeting. But the existence of explicit government directives in this regard produces an inertia in the management towards evolving a new system of budgeting.

13. This point has been discussed in greater detail in the author's paper on "Pricing in Public Enterprises."

on some of the vital issues in the way of the management having a clear view of what it is striving for. The lack of precise objectives stands in the way of the development of a sense of direction for the managerial activity of which budgeting is a part. If the management is not very clear about its objectives regarding production and pricing there is no implicit or explicit compulsion on it to orient its budgeting to realising its commercial or non-commercial objectives, which in turn is manifest in the lack of anxiety on its part to abandon the traditional approach towards budgeting and all that it implies.

Lastly, the virtual absence of accountability on the part of the management for the financial results of the enterprise may also be contributing towards the same. It is obvious that when the objectives which the management is expected to pursue are not precisely defined, the management cannot possibly be held accountable for any particular set of results. Nevertheless, most public enterprises do not at present have even an explicitly stated minimum obligation of covering their costs. A study of the enabling statutes of some major public corporations and the articles of association of 42 Central Government Companies reveals that the Government has not put even this minimum obligation on them. Of course, in the case of many enterprises, the enabling statutes or the articles of association, as the case may be, do contain provisions which might be interpreted to signify an obligation of that import. That, however, is obviously, not sufficient since the very possibility of different interpretations detracts from the force of the provision.<sup>14</sup>

### 5. Suggestions for Reforms

The need for reform in the budgetary practices of public enterprises has been felt for long. Various suggestions have been offered in this regard, but generally the focus of these suggestions has been on technical matters relating to budgeting. What is perhaps needed is a change in the man-

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14. These points have been discussed in greater detail in the paper on "Pricing in Public Enterprises" written by the author.

agement philosophy which gets reflected in the budgetary practices that obtains at present in the public enterprise sector. This, however, need not undermine the importance of reforms in the technical aspects of budgeting, since there is an inevitable link between the two: the overall management philosophy and the technique of budgeting.

As a first step towards budgetary reform the overall obligations of public enterprises, generally as well individually, should be defined with a greater measure of precision and clarity. The obligations of the enterprise may be both in respect of financial and non-financial matters, the latter possibly having financial implications. To borrow a phrase which has already been used elsewhere, each enterprise should be given a precisely defined "financial framework" which should clearly bring out in particular the policy of the enterprise in regard to output, prices and the rate of return on capital. With its objectives defined in precise terms, it would be possible for the management to orient the focus of its budgeting in more meaningful directions than it is doing at present.

Secondly, public enterprises should, in general, be required to prepare their budgets in greater detail than they do at present. The budgeted expenditure should be classified in a more meaningful manner showing the distribution of expenditure according to (a) the programmes and activities to be financed by the proposed expenditure, (b) the end results flowing from the expenditure in question, and (c) as far as possible, the structure of responsibility centers in respect of the programme to be realised. In other words, there is need for introducing a great measure of "performance element" in the budgetary classifications. Further in a business enterprise, there is an inevitable link between expenditure and revenue, both bearing on the overall results that is sought to be realised. The budget should, as far as practicable, bring out the relationship between the different variables on revenue and expenditure and further the bearing of revenue and expenditure on the profitability of the enterprise.

The above need not necessitate a complete redesigning

of the presently existing budgetary system.

The broad divisions in which public enterprise budgets are being prepared at present (viz., capital, revenue and ways and means budgets) may well be retained. But the contents of each would have to be classified and presented in a different manner. Expenditure on the capital account would have to be shown project-wise, the expenditure on each project being further distributed between the main constituents of the project (activities) and the objects on which money is to be spent. The aggregates for each project would have to be further distributed according to the responsibility-centres. To a certain extent, the same pattern of classification of expenditure might satisfy the above requirements.

The revenue budget would have to be recast to present an account of the receipts and expenditure by (i) the main components of the product-mix of the enterprise (ii) the responsibility centres for realising the expected results, and (iii) the economic characteristics of the budgeted costs. The revenue budgets of most public enterprises, as they are at present, provide a consolidated picture of the receipts and expenditure relating to the operations (in productive or servicing activities) of the enterprise. The consolidated type of statement has, of course, an importance of its own, but it needs to be supplemented by separate statements giving the details of the major components on the revenue as well as the expenditure side. This implies preparation of a number of "supplementary budgets" giving say, the sale proceeds and costs in respect each of the products of the enterprise, and the breakdown of costs between the major responsibility-centres which may for instance, be the different production shops in a manufacturing enterprise.

The content of these "supplementary budgets" would be determined with reference to the overall perspective which the management has to have in view in using the budget as an instrument of communication and control. This perspective would, in turn, be given by the overall objectives, commercial as well as non-commercial, which the management has to pursue. It is difficult to make any generalisation about the implications of non-commercial objectives from this point of

view. But the implication of commercial objectives is obvious, viz., the content of these supplementary budgets should be such as to enable the management to assess (i) the ultimate causes of the variance between the observed and budgeted estimates, and (ii) the bearing of these variations on the profitability of the enterprise.

An increase in cost over the budgeted amount may, for instance, be due to increase in input prices as well as increase in consumption of inputs over the budget standards. In order that the management is able to ascertain the exact reasons for the variance, the "supplementary budget" relating to the costs in question should indicate the assumptions in respect of the input-prices and consumption-standards on the basis of which costs are estimated. Similarly, the "supplementary budgets" in respect of the sale proceeds of each product of the enterprise must indicate the assumptions regarding the expected prices of the product in question, underlying the estimates of the sale proceeds.

Apart from these "supplementary budgets" relating to the operations of the enterprise, the public enterprises may well adopt the practice of projecting profit and loss accounts and balance sheets. While there are instances of a few—rather very few—enterprises preparing some rudimentary kind of profit and loss statements alongwith the budget, it is doubtful if any enterprise takes care to prepare a balance-sheet for the close of the budget period. Further, it might be useful if alongwith the budget for the normal budget period, the enterprises also prepared a budget for a longer period, covering a number of budget periods. Thus, alongwith the annual budget, a five-yearly budget might also be prepared. The main advantage of this practice would be that it would provide a basis for the evaluation of the performance of the management at regular intervals.

A reform of the existing budgetary procedures on the lines suggested above, should not necessitate any major alteration in the organisational machinery existing in the public enterprises at present. Steps may however be taken to effect a greater measure of co-ordination between the statistical,

budgeting and planning units in the enterprises. There is an obvious case for strengthening the statistical units in public enterprises for meaningful analysis and reporting of data, which is an important pre-requisite of an effective system of budgetary controls.

It would appear that the focus of the suggestions made in the preceding paragraphs is in the main on two points. The first is that there is need for redesigning budgetary classifications in the public enterprise budgets on the lines of performance budgeting. The second is that budgeting in public enterprises should be in greater detail so as to meet the requirements of a business undertaking. The Estimates Committee of the Second Lok Sabha had long back recommended that public undertakings should prepare performance cum-programme statements alongwith their budgets and that they should take steps towards introducing business type budgets. The Committee, however, did not spell out in any detail what it meant by business type budgets. There is no standard pattern of business-budgeting. Perhaps, it would not be feasible to lay down any such standard pattern. It might perhaps be possible to discern a certain measure of uniformity in the philosophy underlying the budgetary practices of business undertakings—philosophy which is significantly different from that underlying the traditional type of budgeting. If the need for orientation in this philosophy (and thereby the pattern of objectives that the public enterprises are following) is accepted, what has been submitted above by way of suggestions logically follows. Whether it is known as a re-orientation towards business type budgeting is a matter of secondary importance.

## RESEARCH ON PUBLIC ENTERPRISES: SOME PROBLEMS OF METHODOLOGY

This paper is devoted to a discussion of some of the problems which the student of economic administration is likely to face in the course of his researches on the activities of the Government. The context is that of research on an individual basis on the conduct of business by the Government. The content of the paper is drawn from the experience which the author has acquired in the course of his researches on public enterprises in various capacities, e.g., as a research assistant, as a lecturer in economics and as an economist associated with autonomous research institutions.

The problems which are being discussed in this paper relate to the empirical investigations into the working of the public undertakings. Strictly speaking, empirical research implies observation and analysis of data with a view to testing a hypothesis. Very often, however, we make investigations without stating our hypothesis neatly. Further, for certain purposes we confine ourselves to observing and describing the facts and characteristics regarding the subject-matter of our study. In a broad sense we may put the research of all these varieties into the broad category of empirical studies. The basis of the present paper is the experience of the author in conducting empirical studies in this broad sense.

The paper is divided into five sections, each dealing with one specific problem arising in the reference context.

### 1. The Preliminary Stages: Obtaining Permission to Collect Information

There is a widespread impression that the Government

are not very enthusiastic about research on their operations by an outside agency. This is believed to be specially true of the business undertakings of the Government. Perhaps there is a certain measure of substance in this allegation. The reluctance of the Government or the management of the Government undertakings in supplying information to research agencies from outside the Government may arise from several reasons of which two may be noted here.

First, they feel that it would not be judicious on their part to disclose information which might be prejudicial to public interest in general, and their own interest in particular. In the course of my research work the Chairman of a public enterprise showed his reluctance to disclose the basis of price fixation by the enterprise on the ground that a public undertaking which had to compete with private undertakings should not disclose such information as might give its competitors a lead over it. The Managing Director of another undertaking adopted the same attitude on the ground that, in his view, the disclosure of information regarding cost and price structure of his enterprise would be prejudicial to public interest.

Secondly, the public undertakings often do not trust the capability of the researcher to be objective and fair-minded in his approach. This is particularly so if the researcher is working independently, i.e., if he does not represent an institution. The management of the enterprise is afraid of wrong interpretation of the data supplied to the researcher, which might put it in an embarrassing situation thrusting on it the onerous task of issuing rejoinders and clarifications later on.

It is difficult to comment on the attitude of the management of the public enterprises in this regard. To a certain extent, probably, they are quite justified in maintaining a rather negative attitude towards the researcher. But on the whole the impression that they are necessarily averse to researches on their operations is a little exaggerated. In a substantial way the response of the management of the undertaking depends upon the researcher's attitude towards the management of the enterprise and the way in which he approaches the same.

A rather common difficulty with people belonging to the academic profession is that they get into thinking that they know a good deal. While generally there is nothing wrong with this attitude, in the particular context under reference here, this sort of attitude on the part of the researcher, for very valid reasons, may turn out to be rather unproductive for the purpose in view. Howsoever well-informed the researcher might be, it is unlikely that he would be knowing more about the working of the enterprise he wishes to study than the management of that enterprise. I have observed the attempts of many competent people in this direction getting gradually frustrated as they inadvertently, and as far as I could see, unintentionally antagonised their informants on account of their self-assured air of importance and their "all knowing" attitude. It is human psychology that generally we do not like to be criticised and much less to be advised.

A qualification may, however, be made to what has been said above. While it is almost always judicious to approach the top officials with a sense of humility, it is sometimes risky to adopt the same attitude while approaching the officials at the middle or lower levels. For, in that case, there is a very grave danger of being regarded as a "novice" and "immature", and of being casually dismissed. I have found that the nature of the response of the informant is closely related to the level he occupies in the official hierarchy of the organisation. Officials at the higher levels are generally sufficiently informed and therefore do not think it necessary to keep themselves on guard. Mostly they belong to cadre services of the Government. Their attitude is generally positive. On the other hand, the officials at lower levels tend to keep themselves on guard and are not very sure of themselves and this psychology stands in the way of their taking a positive attitude towards the efforts of the researcher.

Coming to the second point, the success of the researcher considerably depends upon the method he adopts for the purpose. Generally, the practice in this regard is to prepare questionnaires for seeking information on the points under in-

vestigation, and then send the same to the informants. Very often, however, this method does not work in the context of the studies relating to the working of public enterprises. Some time back I had paid a visit to the Chittaranjan Locomotive Works and there in the correspondence files of the Financial Adviser, I saw a big questionnaire sent by a professor of economics (now no more). The questionnaire had been lying there for quite some time and I could easily sense that the authorities concerned were not very anxious to attend to it. I have myself had some experience of making futile efforts to obtain information in this way.

Apparently, it may seem that the authorities display a curiously cold attitude towards the endeavours of the researcher to obtain information through questionnaires. But with a little deeper analysis of the situation we might probably be inclined to appreciate their attitude better. Firstly, the administration of public undertakings in our country strongly bears the reflection of the administration of public services in general. An important principle of the administration of public services is that the public servants should record their views and decisions on the matters being dealt with by them and should be prepared to defend the same in case they are questioned. The public enterprises have also rightly or wrongly adopted this principle. One consequence of this is that the officials of the public enterprises are hesitant in expressing their opinion and are rather unwilling to commit themselves in writing. The weaker the top administration of the enterprise, the greater is the hesitation and unwillingness of the officials in this regard. This is one of the reasons why the method of sending questionnaires to the public enterprises does not work.

Secondly, the officials who are technically and otherwise competent to give information or opinion as asked for in the questionnaires very often do not have sufficient time to spare for the purpose. This is partly accounted for by the top-heavy type of administration that the public enterprises have generally borrowed from the Government. An important

characteristic (or limitation) of this type of administration is that the levels of decision making are rather too few, concentrated at the top. As a result, generally, only people at the top levels of the administrative hierarchy are competent to send out information relating to the working of the enterprise and these people are generally already overburdened with work. Even if they have the necessary technical and secretarial staff to assist them, they would not like to put their signature on outgoing despatches unless they are quite sure that the information they are sending out is not such as can be used in a manner which would be prejudicial to the interests of the enterprise.

Thirdly, there are several matters regarding the operation of public enterprises in respect of which adequate information cannot be obtained through the questionnaire method. The questionnaire method works if the matters on which information is sought are such as to admit of a straight and short answer. In case, however, long explanations need to be given in answer to the questions raised, the informant becomes reluctant to take the necessary trouble. In regard to such matters the questionnaire or any other method of obtaining information is no substitute for discussion.

On the whole, therefore, it may be unfair on our part to blame the authorities too much for their cold response to the long questionnaire that the researchers often send to them for obtaining necessary information. The researcher would almost invariably be much more successful in his attempts if he approaches the authorities personally.

Basically the attitude of the authorities is generally not negative, provided they are convinced that the researcher is clear about what he wants to know and he is prepared to take pains to achieve his objective. On the other hand, there is definitely some substance in the allegation that the authorities not unoften adopt a suspicious attitude towards the independent research worker. They put, quite naturally, a greater measure of trust in the research teams sponsored by Government or semi-Government institutions. Presum-

ably, this may at least partly be accounted for by the general atmosphere of distrust and suspicion in which we are living in India. Any further comment on this question is, however, beyond the scope of this paper.

## 2. Eliminating the Element of Bias in the Information Collected

As indicated in the previous section, in the course of his work, the researcher may well have to investigate matters in regard to which documentary evidence is not available. An illustration in point would be the inquiries into the basic motivations behind certain policy decisions. Often the declared objectives behind the policies adopted by these enterprises do not express the real motives behind these policies. Another illustration might be provided by the investigations into the complex of factors bearing on the content of the decisions being studied. In all such cases the researcher would have to obtain necessary information through formal or informal discussions with the officials concerned.

One grave danger of relying on the information provided by the informant through discussions is that the conclusions or inferences drawn from such information may tend to get coloured by the personal prejudices of the informants. This is a rather common type of problem which the researcher has to tackle in statistical investigations. The theory of statistics suggests several methods of eliminating the errors arising from bias among the informants. There is, however, a slight difference between the problem of eliminating bias that the researcher faces in statistical investigations and the problem under reference here. When the population of informants is large, the element of individual bias in the information provided by them tends to get neutralised, and by a relatively minor processing of the data we can arrive at a fairly close approximation to the truth. In the particular case under reference, however, the number of informants is seldom large, nor is the nature of information sought such as to admit of statistical processing. The task of eliminating

the element of bias in the information given by the officials in the context under reference, therefore, calls for a somewhat different type of approach from that generally adopted by the statisticians in empirical investigations.

The bias in question may be accounted for by a variety of factors. To some extent it emanates from the ignorance of the officials concerned. On several occasions, the officials I interviewed gave me wrong and misleading information simply because they were not fully informed about the subject being discussed and, at the same time, they did not like that I should get the impression that they did not know what was happening in the departments of which they were holding charge. It is much more true of the officials at the higher levels of the administrative hierarchy than of those at the lower levels. Secondly, it results from an unconscious attempt on the part of the officials concerned to defend the working of their departments. This is specially likely to occur if, in the course of discussions, the researcher puts the official concerned in a wrong corner. Thirdly, it may arise from the personal prejudices of the informants. This, I feel, is the most common factor responsible for bias among the informants. Prejudices may exist for various reasons, e.g., strained personal relations with colleagues working in the same office, ideological leanings and diversified loyalties. The most usual way in which the prejudices of the officials get expressed is that in such cases the information given by them is coloured by judgment, not unoften containing implicit insinuations and aspersions on their colleagues or superiors. Once the Chief Executive Officer of a big public enterprise gave me some information on certain policies of the enterprise which implicitly contained a charge of dishonesty against the Minister concerned. Later on, I found that the information given by him was wrong in certain respects and that there was no substance in the charges implicit therein. On inquiry, I gathered that the officer in question was not having good relations with the Minister, and it was probably on account of this that he was making allegations against the latter.

I cannot furnish an instance in which the officials provided wrong information to the researcher deliberately. I should consider this to be a rather rare occurrence. Normally, once the formal permission to collect data is granted, the attitude of the officials is, by and large, sympathetic towards the researcher.

The elimination of the element of bias in the information given by the officials often turns out to be a difficult task. An effective way in which the researcher can tackle it is by cross-checking the information received from one source with that received from another source. In an organisation of the type that we have in public enterprises, usually the assignments of one department have direct or indirect bearing on those of a few other departments. It can easily be seen that the complex of activities of such organisations cannot be divided into watertight compartments; there being an inevitable relationship between the activities in one direction and the same in another direction. Thus there is an inevitable overlapping between the tasks of the planning and the budget departments of an enterprise. In respect of many matters, the formulation as well as the execution of policy is, in the ultimate analysis, a joint responsibility of several departments. A case in point would be the formulation of tariffs. In almost all the enterprises whose working I have studied, tariffs are formulated in consultation with several departments, e.g., those of planning, accounts, and statistics. In regard to such matters, the researcher can adjust the information collected by him by checking and cross-checking the information on the same subject received from one department with that received from another.

The application of this method may be profitably carried a little further. The public enterprises, even when they are autonomous bodies, have an inevitable liaison with the Government. Often many of the top Government officials are represented on the control boards of these enterprises. At the State level, the Development and the Finance departments of the State Government are directly concerned with

the enterprises established by the State Government. The information obtained from the officials of the autonomous bodies may well be cross-checked with that received from the Government officials. This I have found to be of special value in cases where the matter being investigated relates to the basic policies of the enterprise and thereby is of vital concern both to the Government and the enterprise in question. Thus on one occasion a top official of a public enterprise gave me some information on the price policy of the enterprise the accuracy of which was vehemently questioned by the Chief Secretary of the Government of the State. On another occasion, the officials of the parent Ministry contradicted the information supplied to me by the enterprise, showing me the original documents containing information on the subject in question.

Very often, however, it is possible to distinguish the element of bias in the information collected by sheer exercise of logic and common-sense. It has been my experience that when I held long and frequent discussions with an official, I could easily locate the extent of bias in the information obtained from him. The reason is that when the informant, who is subject to a certain type of bias, is made to express his views or report on a large range of interrelated subjects, he tends to become inconsistent in his statements, and for a careful listener it is not very difficult to find out the truth. Logical reasoning and careful analysis of the information obtained would, I suppose, go a long way in enabling the researcher to achieve his objective in this regard. Once I had the opportunity to discuss the content of public interest with a member of the control board of a public enterprise and during the course of discussion I was forced to corner him several times in order to find out what exactly the enterprise intended to keep away from public view under the cover of public interest.

### **3. Obtaining Documentary Evidence of the Information Gathered**

Fastidious academicians often hold the view that the researcher should not base his judgment on facts about which authentic documentary evidence is not available. Some

would go to the extent of saying that information about which documentary evidence is not available should not be taken into account by the researcher at all. There is much to say in favour of this view but the researcher may not find it easy to obtain documentary evidence of information collected even though he has every reason to believe that the information collected by him is accurate. This difficulty is particularly conspicuous when, as in the case under investigation, the investigation relates to the current working of an organisation. Why this is so and how the researcher can tackle this problem constitute the subject matter of discussion of this section.

At the outset, however, it may be clarified that this problem does not arise in case the research is sponsored or undertaken by the Government itself. For in that case the agency conducting the research, whether it consists of an individual or a committee, almost invariably gets full access to the records relating to the working of the organisation. The Government, almost invariably, have full powers to order the enterprise to furnish all information needed for the research project. In case, however, the researcher is working independently without the explicit backing of the Government, it is entirely the discretion of the management of the enterprise whether and how far to allow the researcher to go in connection with his work. The problem is, therefore, more or less specific to research work undertaken in the particular context to which the discussion here relates.

Further, the problem is essentially associated with the nature of research under reference here. Research in economic administration in India in general and in the field of public enterprises in particular, is, by and large, of two types, viz., the fact-finding type and the analytical-cum-normative type. In the first category, we may put what we know as the "base-line studies" which are primarily intended to disseminate information and provide the necessary factual basis for further research. Studies of the second type, on the other hand, are intended to evaluate the existing system and suggest guidelines for improvement. The problem in question

arises in particular in the context of the studies belonging to the second category.

The reason for this, in the main, is that the base line studies are intended to present facts without implying judgment. The scope of such studies on public enterprises is confined to elaborating the technical aspects of the external and internal administrative structure of the enterprise and the presentation of such operational and financial statistics of the enterprise as are made public by the enterprise either voluntarily or under the compulsion of law and convention. (Examples are the studies published by the Ministry of Finance and the Central Statistical Organisation). Normative and prescriptive studies, however, aim at going deeper than fact finding and are intended to make evaluation in the light of some norms of performance or to test some implicitly or explicitly stated hypotheses. As such, in conducting such studies, the researcher has to cast his glance beyond the technical and formal aspects of the subject matter of his study, in order to understand the true nature and content of the behaviour of the organisation as an organic body. In the case of base line studies, since the objective of the researcher is merely to describe, he can stop his inquiry at any convenient point without much damage to the quality of his work. But in making a normative or prescriptive type of study, he has to collect full information on the points of his inquiry; otherwise his analysis might turn out to be misleading and unrealistic. This relates to studies in all dimensions including those which are primarily statistical in character. (In regard to statistics, for instance, he may have to enquire into the factors which have contributed to the building up of the totals exhibited by the enterprise). Information on such details is often not recorded and even if it is recorded, the enterprise may be unwilling to divulge it. It is here that the researcher faces the problem of convincing his readers of the truthfulness of his findings.

The problem extends in three dimensions. One is that of obtaining information that is regarded as confidential and

getting necessary permission to use it. The second is that of getting recorded information on matters regarding which records are not kept. The third is that of getting recorded and signed opinions of the officials as needed for the research project.

As is well known, adopting the practice in the Government, the public enterprises are in the habit of marking a fairly large proportion of their records as "secret", "confidential" or "for official use only". To a certain extent, this procedure can be defended on the grounds of security and expediency. But personally, I have found that to a considerable extent this practice is followed without there being adequate justification for it. Probably this is simply because those who run the administration of public enterprises are still largely drawn from Government services and it is not possible for them to get rid of their long acquired habits. Partly it may be because of the fear of unwelcome criticism. Whatever might be the reasons for this, what is significant in the present context is that the researcher often feels greatly handicapped in conducting his work on account of this practice.

Sometimes it may not be so very difficult for the researcher to get access to the information he needs, if he maintains good relations with the persons who are in charge of the documents. In the course of my research work on a public undertaking under the Ministry of Defence, I had faced this difficulty in a formidable measure. But in due course, I was able to develop a bit of intimacy with some officers belonging to the undertaking in the parent Ministry who took me into confidence and allowed me to take notes from the "confidential" as well as "secret" and "top-secret" documents relating to that enterprise. I had similar experience in the course of my work on some other undertakings also.

But obviously one cannot always depend upon developing sufficiently close personal contacts for the purpose in view. A direct approach to the authorities for releasing the information needed may sometimes work, but generally the attitude of the civil servant is rigid on this question. The difficulty

with the civil servants, especially those at higher levels, is that once they take a stand, they would not like to alter it. A more effective method of tackling the problem might be to approach the politician heads of the parent Ministry of the enterprise in question. I have found that it is much easier to convince a public man than a civil servant. But here one has to guard against being misled by empty promises.

While getting access to the "classified" information is a difficult task, a greater measure of difficulty arises in getting official testimony regarding the authenticity of the information collected and the permission to use the same in connection with the research work in question. The problem arises, in particular, in case the researcher gets the information required through personal contacts.

The researcher may, after obtaining the necessary information, request the authorities for the necessary permission. Often this method of dealing with the problem bears fruitful results, but it may turn out to be risky as well. On one occasion, I succeeded in getting hold of some classified information regarding the cost structure and price policy of a public enterprise and prepared an analytical note on the basis of the same. I sent a copy of the note to the authorities concerned through the parent Ministry. The management of the enterprise in question reacted promptly and sharply, requesting the Ministry to investigate the matter and find out how the information had leaked out. In the usual course, the matter would, perhaps, have been referred to the Intelligence Department and I might, to my most unpleasant surprise, have found myself behind the bars. But fortunately I had a close friend in the Ministry who somehow managed to destroy the original copy of the letter from the enterprise to the Ministry and I was saved.

Often a careful and discriminating researcher may find that he can use the information so acquired in such a manner as not to cast a direct reflection on the working of the enterprise. The confidential information would help him in having a better understanding of the subject he is studying and

with a little tact he can argue his point by using what in mathematics is known as the process of elimination. This may be explained with the help of an abstract illustration. Let us suppose that the researcher has come to know that the causal explanation of the phenomenon P is A, but he cannot make an assertion to this effect because he does not possess the necessary documentary evidence to support his assertion. He can, however, indirectly show the causal connection between A and P by showing that other possible explanations are not acceptable in the particular situation under reference. Let us suppose that altogether there are three possible explanations of P, viz., A, B and C. If the researcher has sufficient material to show that B and C are not plausible or acceptable, he can make a case, though rather weak, in favour of the causal connection between A and P. Often this is enough for the purposes that the researcher has in view.

In extreme situations the researcher can secure his end by pressurising the authorities. This is a rather nasty way of dealing with the problem, but sometimes this is the only way left to him. I must confess that personally I have never had the occasion to use this technique, but I have seen a few of my friends using it as a last resort. The best way to do it is to approach a member of the Parliament or Legislature and request him to put a question to the Government asking information on the particular points that the researcher has in view. I have observed that almost invariably the questions put by the members of the Parliament and the Legislatures are attended to with remarkable speed and sincerity both by the parent Ministry concerned and the management of the enterprise. Generally, the authorities entertain these questions well and unless a very vital interest of the State is involved, provide the information sought. The principal defect of this method is that if the authorities come to know of the hand of the researcher behind it, they would certainly stop cooperating with him any further. In any case, on the whole, I would regard this method as of being in bad taste, as it would almost certainly antagonise the authorities and would harm the overall interests of research.

The second problem arises from the fact that the organisation in question may not be keen on keeping records in the form and in the details needed by the researcher. (Another aspect of the problem arising from the deliberate suppression of facts is discussed in the next section). Insofar as the information sought is not regarded as confidential or secret by the authorities, the researcher is not likely to face much difficulty in getting the same, provided he is prepared to wait patiently for the convenience of the authorities, as the official machinery works a bit slowly. The questionnaire method can be fruitfully used in such circumstances, provided the questions are such as not to necessitate long and detailed explanations.

Obtaining recorded evidence of the views of the officials is probably a much more formidable problem than that of obtaining access and permission to use confidential information. Generally, the officials are not averse to expressing opinion but almost invariably they do not wish to give anything in writing. The reasons for this are too obvious to be commented upon. I have come across officials who were rather very anxious to express their views but were equally afraid of being quoted. I am reminded of a top official of an enterprise, who, in the course of my discussions with him, gave me very useful information on many matters relating to the working of the enterprise he was associated with, adding at frequent intervals that "all this is off the record".

If the researcher is interested in the working of the enterprise in general, he might with profit approach the ex-officials of the organisation. Generally, the officials do not hesitate in recording their opinion on the organisation after they have left it. I had an occasion to interview the Chairman of a public corporation twice, once when he was in office and later when he was out of office, and I was surprised to notice the change in his attitude. On the former occasion I found him taciturn and tight-lipped to the point of being indifferent. On the later occasion, in response to my questions relating to the enterprise he was heading, he prepared a ten page note,

signed it and handed it over to me explaining that "now I am in position to express my views."

Such opinion would not however serve as a substitute for the opinion of the official currently working in the organisation. If, however, the researcher is interested in studying the past working of the organisation, the opinion in question might be of some help.

As a matter of fact, I do not know a sure way of making the official give his opinion in writing. In the ultimate analysis the success of the researcher in his efforts in this regard would depend upon the cooperation of the officials. There are many matters concerning the technical and constitutional aspects of the working of the undertaking about which he may be able to get the recorded opinion of the officials without much difficulty. On the other hand, on certain matters, especially those relating to basic policies and inter-departmental relationships, the officials may not like to express their views in writing. Further, the "cadre officials" generally tend to be more frank and courageous in this respect than the regular employees of the enterprise. In this connection I am reminded of the reaction of a "cadre officer" and a "non-cadre officer" of an enterprise, whose working I was studying, to an identical request made by me to them to give their opinion on certain matters relating to the administration of the enterprise in question. Both officers were of the same rank, but while one was on deputation from the Indian Audit and Accounts Service, the other was a full-fledged employee of the enterprise in question. The response of the former to my request was something like this: "Well I think I have reached a stage in my career in which I should not be afraid of expressing my opinion". In contrast to this the latter responded in this manner: "I am not afraid of being quoted because I won't say anything which might harm the interests of the organisation to which I belong". It can easily be seen that the success of the researcher in this regard would depend upon many factors and it would be hazardous to make a generalisation about these.

#### 4. Probing Beyond what the Records State

While as a matter of policy it is advisable on the part of the researcher to base his research as much as possible on recorded facts, too much reliance on recorded facts may sometimes turn out to be deleterious to his basic objective, namely discovery of truth. Very often what is recorded on files and what is released "for public consumption" do not represent the truth in the matter. In this connection I may recall what I had once read in a literary work. "Language", it said, "has been bestowed on man more to conceal his ideas than to reveal them". In the course of my work I have observed that this is often true of public undertakings.

The danger of being misled by records extends in several dimensions of which I will refer to three, viz., (a) in the interpretation of basic policies, (b) in the assessment of the execution of these policies, and (c) in the evaluation of the overall working of the enterprise.

In several cases I have discovered that the actual objectives behind a policy are substantially different from the stated objectives. The managements of the public enterprises are susceptible to pressures from various directions as a result of which a variety of factors bear upon the formulation of their policies. There is of course nothing strange about it and this may in a lesser or greater degree be true of all organisations. But the distinctive characteristic of public enterprises is that they are accountable to the public and the Parliament, and as such they have to justify their policy to the satisfaction of their masters. As a result, they are sometimes forced to make declarations in defence of their policies which are fairly far away from the truth. While studying the working of a public utility undertaking, I discovered that it was charging concessionary rates to a certain group of the buyers of its products. Apparently, this policy was justified on the ground of encouraging certain types of industries in the region falling within the jurisdiction of the enterprise. On closer examination of the issue, I came across sufficient material to conclude that there was no substance in the avowed justifica-

tion offered by the enterprise for this policy. Presumably, the Minister of the parent Ministry concerned had got interested in the customer firms getting the privileged treatment and had put indirect pressure on the management of the enterprise to adopt the policy in question.

I think few would disagree with the view that the researcher should not confine himself to the compilation of facts on the declared policies, but should also study the complex of factors that have contributed to the emergence of these policies. It is just possible that the researcher may, to his utter surprise, find that the real motivations behind the adoption of the policies he is studying, are very different from the declared objectives, and this "insight" might well induce him to add a bit of "realism" to his approach to the subject matter of his study.

The chances of being misled by wrong records in respect of the day-to-day working of the enterprise are probably much greater than in respect of the policy matters. But the consequences of such predicaments in the case of the former are much smaller in magnitude than in the case of the latter from the viewpoint of the overall quality of the research work. Wrong or misleading recording of facts occurs at almost all levels of the vast machinery of the Government. Those familiar with the working of the executive branches of the Government at lower levels may well be aware of the way in which and the extent to which the "log books" and the "muster-rolls" are manipulated. The mis-statements at these levels are not, however, likely to distort the findings of the researcher, unless, of course, the focus of his enquiry is very narrow and limited, covering, say, the working of a single executive unit of an enterprise. It is the manipulations and mis-statements of fairly high magnitudes practised in an organised fashion that stand in the way of the researcher. I remember of a Chief Accounts Officer of a fairly big public corporation advising me in confidence not to go by what the profit and loss accounts of the Corporation indicated for "they were made to order". "We consult our bosses as to whether we"

have to show a profit or loss for the year in question and then prepare our profit and loss accounts accordingly."

Of course, there was some exaggeration in what he said, but, as I was able to find out myself later on, there was some substance in his statement as well. In the course of my research on another undertaking, I found that the apparent justifications offered by it for certain aspects of its purchase and sale transactions were to a considerable extent intended to hoodwink the public. Without multiplying illustrations, I would emphasize the basic point that the researcher may come across certain serious pitfalls if he places too much reliance on facts as they are recorded.

Finally, motivated by the same reasons as in the above discussed categories of cases, the public undertakings often prepare and maintain only such records as are likely to exhibit the performance of the enterprise in a favourable light. This, of course, relates only to those categories of records, the preparation and maintenance of which is not obligatory or mandatory on the enterprise. In this category we may put a large part of the statistical material given in the Annual Reports of the public enterprises. In several cases, I have found that the enterprises do not show any anxiety to collect and analyse their records in such fashion as to be useful for the purpose of an assessment of their working. Many of their statistical classifications are also such that to a casual observer it would appear that the enterprise has been performing well on all fronts. From the viewpoint of research, one harmful effect that the perusal of such material might create on the researcher is to instil a bias in his mind in favour of the enterprise in question, which would certainly not serve the interests of objectivity.

How should the researcher tackle the problems posed by these factors? These problems stand on a somewhat different footing from the others discussed above. In the case of most other problems the researcher can go a long way in solving his difficulties by a simple exercise of logic, judgment and tact. The problem of eliminating the element of bias in the infor-

mation received from the officials is largely one of distinguishing between right and wrong or between correct and incorrect. The problem of getting authentic information or opinion is, by and large, one of getting hold of the already recorded information in a proper way. But here the researcher is relatively helpless insofar as the problem he faces is one of finding out facts of which there is no recorded evidence. His difficulties are further accentuated by the fact that there is a deliberate attempt to suppress these facts not only from him but from all who are not directly associated with the situations or events to which these relate.

Ordinarily, it would appear that the researcher can do very little in the matter in question. But on the basis of my personal experience, I can say that with a little use of tact, he can go a long way in discovering the truth although he would never be able to know how far he has succeeded. Although it may appear to be somewhat strange, the researcher may well be helped in achieving his ends by the very persons who have been directly or indirectly responsible for the suppression of the facts in question. Generally, in any office it is not very difficult to find officials even at higher levels of the administrative hierarchy, who are dissatisfied with the working of the organisation for some reason or other. Such people may well come to the help of the researcher, provided they get convinced that the information they give would not be used against them. I recall a singular type of instance in which the management of the enterprise was implementing its policies regarding nationalisation in a manner (of which there were some records, as I came to know later), which if made known to the interested parties might have given rise to a constitutional controversy and possibly a prolonged litigation in the court of law. The information regarding it was supplied to me by one of the officers directly concerned with the matter, who, for some reasons, was very much dissatisfied with the Minister concerned on whose initiative the activities of the enterprise on the matter in question were planned.

The reason why the researcher is likely to come across such disgruntled officials is, as far as I can guess, two-fold.

In the first place, a sense of cynicism is growing among the officials in public enterprises about the nature and significance of the work that they are doing. It is somewhat strange, nevertheless true, that at present both the administrators and the administered seem to be losing faith in the quality and the content of our administration. Secondly, in the majority of cases, facts are suppressed either with a view to blotting out the end results of a mistaken policy or action or to cover up the legally, socially and perhaps morally unjustifiable motivations bearing on the formulation and implementation of the policies in question. It has been my experience that in the official ranks of an enterprise there are some people who are seeking an opportunity to revolt against the existing system as such or against the misuse of power that the system permits. Such officials may provide the information to the researcher on the questions in point.

To a certain extent, the members of the public associated with the advisory bodies of the enterprise (generally known as non-official members) may also provide guidelines for the investigation of the researcher in this regard. These people are, for obvious reasons, more courageous in giving information than the officials concerned. I have found that usually whenever there is an attempt to deliberately suppress a fact, the fact in question tends to become more extensively noted or discussed (although privately) among the officials or non-officials concerned with the organisation. But while the officials do not have the courage to revolt against it, the non-officials do not have the necessary time and analytical ability to pursue the matter. The advantage of the researcher lies in that he may be equipped with the prerequisites for vindicating the truth, viz., courage, analytical ability and time. Given a little ability to create a good impression on his informants, he can go a long way towards achieving his objective in this regard.

### 5. Planning of Interviews

Before concluding I would like to make a few general

remarks about the techniques of interviewing the officials for obtaining information.

Very often the researcher gets a cold response from his informants, even though the latter are not disinterested in his work, simply because he is not sufficiently experienced in interviewing people. Where the information is to be obtained mainly through discussions, the researcher has to proceed very cautiously and systematically, as the success of his project would depend entirely on the co-operation of others. The researcher must realise the value of the time of his informants and try to make the most of the same at his disposal.

A rather common mistake that the researcher commits in this regard is that of approaching his informants without adequate preparation. The informants expect the researcher to know precisely the questions on which he seeks information or opinion. The researcher is further expected to be familiar with all the material already released by the enterprise for the information of the interested parties. Many a time I have come across instances in which the researcher is advised by his informants to look into the published documents of the enterprise which are easily available to anybody seeking information regarding the organisation in question. The basic point is that the researcher has to guard against creating a bad impression on his informant in his very first meeting; it is the first impression which counts most.

The researcher can benefit a lot by classifying his inquiries in accordance with the nature of the questions posed. Some of his questions would, for instance, relate to policy matters, some to opinions of the informants and some to the details of the working of the enterprise. The researcher may well approach officials at lower levels for obtaining descriptive type of information and reserve the time made available to him by officials at higher levels for discussing policy matters. It has been my experience that the officials at higher levels have neither the time nor patience to provide information of a general nature to the researcher. On the whole, it

would be worthwhile for the researcher to try to get the best out of the extent of co-operation offered to him by his informants.

Generally, I have observed, it is rather judicious on the part of the researcher to begin his interviews by contacting the officials at the middle and lower levels and collect all relevant material available with them. There are two advantages in this, from the viewpoint of the researcher. Firstly, it is the officials at these levels who hold the immediate charge of keeping the records of the working of the organisation. If the researcher approaches higher officials for getting information of a general nature, he would most likely be referred to the officials. Secondly, the officials at lower levels are usually in a position to spare the necessary time for the work of the researcher. As has been pointed out earlier, an important characteristic of our administrative system is the heavy concentration of power and responsibility at the top, as a result of which the higher the rank of the official in the administrative hierarchy the more busy he tends to be. A third advantage to the researcher (which I may mention in undertones) in taking this line of action might be that he would thereby be in a position to familiarise himself fully with the intricacies of the working of the organisation he is studying, before he starts examining the deeper and more fundamental questions relating to policy matters. To my great surprise, I have sometimes discovered that the head of a department knows much less about the manner in which the department handles its assignments than do his subordinates.

After completing the necessary groundwork, the researcher would find himself well-equipped to discuss the basic policies with the higher officials who participate in the formulation of policies. In any organisation the policy making levels are fairly high and in holding fruitful discussions with officials at this level, the researcher has to take care to ensure that he is not regarded as a novice in the field. If the researcher shows lack of factual knowledge or if he is inadequately prepared for the discussion the officials may feel that their valuable time is being wasted and may get cold towards

the researcher. One way in which the researcher can avoid the waste of his own time and, what probably matters more, the time of his informants would be to prepare background notes for discussion precisely stating the points to be discussed and send the same in advance to the officials with whom he intends to discuss the points in question. In this way he would be allowing his informants time to think over the problems in question and at the same time prevent the discussion from becoming discursive.

One question which often perturbs the mind of the researcher is whether and how far he should be frank and truthful to his informants. The question is really much more fundamental than it appears to be. To put it a little bluntly, how far should the researcher maintain honesty towards his informants? I have observed several cases of casualties among otherwise competent researchers in the particular field of research under reference simply because they were too truthful to the officials from whom they had to obtain the necessary information. On the other hand, I have seen several people succeeding in their efforts by almost hoodwinking their informants.

Basically it is a moral issue implying value judgments of considerable importance. How far should the researcher ensure purity of means along with purity of ends? Opinions on this question are bound to differ. Personally, I do not find myself in a position to express an opinion on this question.

## 6. Epilogue

My endeavour in this paper has been to discuss a few problems that confront the researcher while collecting information on matters relating to economic administration in general and public enterprises in particular. I have tried to be as objective as possible in the treatment of the subject but an element of subjectivity is bound to creep into the discussion as the experience of everyone is likely to be somewhat unique.

In my endeavour to be frank, I have said many things and I am not sure whether they would be liked by the readers. At the same time I have left many things unsaid. In the ultimate analysis the success of the researcher in the rather delicate task of obtaining information from the public authorities depends upon the overall personality of the researcher, a subject about which no observation can be made. Further, the variables with which the researcher has to deal in achieving his objective are so very diverse and multifarious that we can hardly develop a general methodology for the same. A technique which has been fruitful in one case may turn out to be disastrous in another even similar type of case.

## APPENDIX I

### A NOTE ON THE EXISTING MATERIAL RELATING TO APPRAISAL OF MANAGEMENT'S PERFORMANCE IN PUBLIC ENTERPRISES IN INDIA

Assessment of the performance of the management as such is not being done in India either by the Government or the non-Government organisations, but several agencies in the Government do make a study of the working of public undertakings which have a bearing on the performance of the management. (They do not, however, aim at 'judging' the work of the management). Three such agencies are the Bureau of Public Enterprises, the Parliamentary Committee on Public Undertakings and the Comptroller and Auditor-General of India. The *modus operandi* as well as the approach of their work is briefly discussed in the paragraphs that follow.

(1) The work of the Bureau of Public Enterprises is published as "Annual Report on the Working of Industrial and Commercial Undertakings of the Central Government." It is largely a descriptive work covering a number of undertakings. Broadly, it can be divided into two substantive parts, one containing general information on the working of the undertakings covered and the other giving an analysis of the balance-sheets and profit and loss accounts of these enterprises. Each enterprise is discussed separately both in the first and the second part.

The descriptive part of the report is intended to give a general idea of the activities as well as the finances of the enterprises in question. It provides information on the production programmes and achievements of each enterprise. It also contains useful information on their financial position and the capital structure. However, there is a lack of uniformity in the treatment of the different enterprises covered. There is no set pattern of coverage of relevant matters in respect of different enterprises. For example, in the Report of the Bureau for the year 1964-65, the material on the Bharat Electronics Limited, gives an account of the history of the enterprises while information regarding the company's production programmes has not been given. The same report, however, contains a detailed statement of the production capacity as well as achievements of the Hindustan Cables Limited. Further, whereas in the case of Hindustan Machine Tools, the report gives a detailed coverage of the expansion and investment programmes of the

company, in the case of the National Instruments Limited, similar data have not been given. On the whole it seems that insofar as this part of the work of the Bureau is concerned, a clear perspective or an overall objective in compiling the facts is yet to be evolved.

The analysis of the finances of the undertakings given in the Bureau's Report is more methodical and systematic than the general discussion of the working of the enterprises. The pattern followed is more or less uniform and presumably the concepts of working capital, net profits, etc., imply the same thing in the case of the different enterprises covered. Here again, however, it is difficult to arrive at definite conclusion on the management's performance on the basis of the analysis contained in the Report. It is, nevertheless, possible to arrive at some broad conclusions about such questions as rate of growth, capital structure, etc., from the information provided in this part of the work.

(2) The reports of the Committee on Public Undertakings (Lok Sabha) are more exhaustive and analytical than the reports of the undertakings or those brought out by the Government. They cover both the economic and the administrative aspects of the working of the undertakings examined. The approach adopted therein is both fact finding and suggestive.

The focus of the Committee's reports is on a general appraisal of the activities and organisational structure of the enterprise. They examine the different aspects of the same piecemeal, and point out the specific instances of weaknesses as well as lapses on the part of the management in the discharge of its managerial functions. Although broadly commenting on managerial performance, these reports do not make an overall assessment of the work of the management. They follow the traditional pattern of the reports of the Estimates Committee of the Lok Sabha. Yet, the material contained in them can be of great use in making an assessment of the management's performance.

(3) The reports of the C & AG bearing the title Audit Report (Commercial) have a wider coverage than the same of the Bureau of Public Enterprises. They are based on the audit reports conducted by the professional auditors as well as the auditors of the C & AG.

The Audit Reports classify the public undertakings according to their organisational form, viz., (a) company type organisations, (b) public corporations, and (c) departmentally run undertakings. They contain brief as well as detailed analysis of the working of the undertakings covered. But most of the undertakings are dealt with only briefly. Thus, in the C. & AG's Report for the year 1966, out of the 61 companies covered, only 4 have been dealt with in some detail. Out of these four again the Hindustan Steel claims a large coverage. As regards corporations only three of them have been covered, of which two have been given a somewhat detailed treatment. Nine departmentally managed undertakings have been discussed of which four have been given detailed treatment.

Apart from the specific coverage of individual undertakings the Report also contains a general resume of the public undertakings classified under the three broad categories referred to above. Thus there is one section each on the working of the company type undertakings, public corporations, and departmental undertakings. They each provide a kind of general appraisal of the enterprises belonging to the category in question.

The general discussion is based on an aggregative and statistical approach to the working of the public undertakings belonging to the each group. The aspects covered are more or less the same in respect of the different categories of enterprises. In the main, the focus of this general appraisal is mainly on the return value added by production. There is very little on appraisal of the management's performance in this part unless we indirectly associate the sectoral results in the public sector to performance of management in individual undertakings.

The discussion of the working of the individual enterprises is not uniform either in depth or coverage. With reference to the company-type organisations the report contains a detailed account of the various aspects of the working of the Hindustan Steel Limited but in respect of other undertakings the treatment is not equally comprehensive. Further, the aspects dealt with in the case of different undertakings are not alike. In the case of the Hindustan Steel the emphasis has been largely on investment programmes for further expansion, usage of inputs and working of individual units of production. The question of pricing has for obvious reasons been left out. But apart from pricing many other important questions relating to the financial management and financial results have also been ignored. The coverage of the Hindustan Shipyard is broadly identical to that of the Hindustan Steel. But in the case of the Hindustan Photo Films Manufacturing Company, financial matters as well as production achievements and programmes have not been dealt with at all. In the case of Air India, there is a detailed analysis of the operational results of the undertaking, a point which has not received adequate attention in the discussion of the company-type undertakings. The analysis of the working of the Indian Airlines Corporation is more or less on the same lines as that of the Air India.

Broadly, the work of the C & AG is largely intended to examine the lapses in the working of public undertakings. Its focus is diffused. Further, apart from the few enterprises that it studies in detail, the rest do not get sufficient attention to present an exhaustive picture of how the enterprise is running. The comment on the working of the 45 companies contained in the Report hardly provides even the barest minimum of information needed to have an idea of the functioning of the undertaking from any point of view. This part of the Report is mostly confined to specific issues relating to the internal organizational structure of public enterprises.

From the viewpoint of judging the performance of the mana-

gement, the material contained in this report is of some significance insofar as it contains detailed studies of the enterprises covered by it. The information given in it can be useful for assessing the reasons for inadequate performance and for exploring the areas in which measures for improvement can be taken. But the analysis given is by no means adequate for assessing the performance of the management. This is accounted for by the fact that the C & AG's report is largely based on the reports of the auditors whose focus is on specific cases of lapses on the part of the management of the undertaking concerned.

## APPENDIX II

### NOTES ON MANAGEMENT ACCOUNTING AND STATISTICAL ORGANISATIONS IN PUBLIC ENTERPRISES\*

1. Hotel Corporation of India; India Tourism Corporation; India Tourism Transport Undertaking. The three tourist companies have been set up recently. Pending the proposed amalgamation of these companies, no economic, statistical, research and development wings or organisations for assisting the management have been set up in any of the three undertakings.
2. Indian Rare Earths. The company has not set up a separate economic or statistical organisation so far. The respective departments of the Company do, however, get ready necessary details for making them available to the management for purposes of formulating policies and programmes.
3. Indian Oil Corporation (Refineries Division). The undertaking has a statistical organisation at the Head Office. There is a proposal to set up a Central Technical Services Department to maintain all technical and statistical data about the refineries and to initiate new schemes, modifications in the plants etc. At present in order to keep proper checks and accountability at various levels, the system of returns and periodical reports has been devised in order to assess the performance of each plant.
4. Export Credit and Guarantee Corporation : The executive officer of the Accounts Department maintains the accounts and furnishes the information required by the Secretary and the Managing Director from time to time. The Statistical Section, under an executive officer, compiles, tabulates and maintains statistics. Monthly, Quarterly and Annual Statements to the Board of Directors etc., are prepared.
5. Hindustan Steel. It being a multi-plant organisation, management accounting in the company is done at the plant and Head Office levels. The internal reporting system prevailing at present at the plant level is as follows:
  - (i) Information regarding production, break-down despatches etc., are supplied to the General Managers and

\*Based on information collected from official documents, and personal interviews.

General Superintendents everyday through Daily Production and Despatch Reports. The General Superintendents hold meetings with the Superintendents and Chief Superintendents concerned where performance of shops is evaluated and difficulties experienced are discussed.

- (ii) Reports regarding production, hours worked, breakdowns etc., are available to Shop Superintendents, and Assistant Superintendents on the spot.
- (iii) Information regarding costs is made available through Monthly Cost Sheets prepared by the Costing Section.
- (iv) Weekly Cash Balance Statements & Monthly Profit and Loss Account etc., are prepared in the plants for their own review and control.
- (v) Fortnightly Summaries regarding value of stores, spare parts and raw materials are prepared by costing and O & M departments.
- (vi) Monthly stocks of stores and spare parts, raw materials, purchases are brought to the notice of all top officials.

At the Head Office level management accounting information is supplied by plants to the Head Office through the following statements :

- (i) Daily Production Report
- (ii) Weekly Production Despatches and Stocks Report
- (iii) Monthly Progress Report
- (iv) Monthly Operation Report
- (v) Monthly Cost Sheets
- (vi) Indices of Cost and Productivity
- (vii) Weekly Cash-Balance Statements
- (viii) Monthly Profit and Loss Account
- (ix) Monthly Statement of Expenditure
- (x) Quarterly Financial Review.

6. **Hindustan Salts:** The company has not set up a separate statistical organisation so far. The required statistics are worked out by the respective departments both at the Headquarters office and the Units.

7. **National Coal Development Corporation:** The Corporation has set up a Costing and Statistical Department which provides the management at the various levels with necessary data for formulating its policies and programmes.

8. **Oil & Natural Gas Commission:** The Finance and Accounts wing of the Commission has Accounting Sections which

study the cost of wells, their construction etc., and submit periodical Cost Reports to the management. An Economy Committee has also been set up to consider important points brought out by Internal & Statutory Audits and to suggest remedial and preventive measures.

The Economics and Statistics Division at the Headquarters and similar sections at other levels is headed by a Joint Director who has trained technical personnel. These Divisions and Sections help the management in consolidating the short and long term plans and the progress reports, formulate and evaluate Five-Year Plans, co-ordinate data for the annual programme of work, prepare progress reports, co-ordinate and supply information, assess foreign exchange requirements, incentive bonus schemes and rationalize reports and returns etc.

9. **Fertilisers and Chemicals, Travancore:** Management accounting has been introduced recently in the company. Some of the executives of the firm have been trained in these techniques and compact system is under implementation.

There is an Economic & Statistics Section working along with the production and costing departments. Information required to enable the top management to review and revise decisions involving costs, prices, investments etc., is obtained from the Finance, Statistical and Marketing Departments.

10. **National Mineral Development Corporation:** In the Head Office of the Corporation a high-powered Financial Controller and Chief Accounts Officer is in overall charge of budgeting, budgetary control, maintenance of accounts and internal consultancy services. He is assisted by Deputy Financial Controller, Deputy Financial Advisers, qualified cost accountants etc. The costing section is being strengthened so as to enable it to play its proper role in advising the management on cost, price policy, reducing operating costs etc.

11. **Hindustan Housing Factory:** The basic requirements of a management accounting system have been introduced. Monthly reports of production, orders in hand, sales breakages, number of workers employed, stocks of finished goods, job cost statements etc., are sent to the top management. Monthly reports of purchases, orders in hand, production, and variations from budgets are also furnished alongwith the above.

12. **Indian Telephone Industries; Hindustan Teleprinters:** The preliminaries of management accounting introduced in these undertakings comprise reporting on the activities of the organisation periodically in the following ways:

(1) **Physical Programming** (Monthly and sometimes weekly): Actual production is compared with the targets, each Division preparing its report. Monthly production programmes are decided in an inter-departmental meeting presided over by the Managing Director. The Monthly Report is forwarded to the Board of Directors.

(b) **Financial Programming:** This comprises budgeting, estimation of the actual expenditure, preparation of ways and means position, forecast of profit and loss, revision of estimates; preparation and forecast of manufacturing, trading and profit and loss accounts and the balance sheet. The Budget Programme consists of Capital Programme, Replacement and Renewal Programme, Sales Budget, Production Programme, Purchase Budget, Revenue Budget, Ways and Means Budget. These are submitted to the Board of Directors every year for approval.

13. **Central Road Transport Corporation:** The Corporation does not have a separate statistical organisation at present. There is only one Statistical Section which compiles monthly operational and financial statistics. This is regarded by the management of the undertaking as inadequate.

14. **Minerals and Metals Trading Corporation of India:** The Corporation has only made a beginning with regard to management accounting. There is an Economic Division which is also its statistical wing. All the available market data on ore trade are collected by this Division and published for circulation. This work is done as a part of the Financial Adviser's job. Elaborate data with relevant comparisons on the ratios of cost, liquidity, sectorwise profitability etc., are put up to the management. Further, industrial contracts are selected at random for study.

15. **Mogul Lines; Cement Corporation; Instrumentation Ltd.:** No steps have yet been taken by these companies towards setting up a statistical unit.

16. **Neyveli Lignite Corporation:** The Central Statistical Organisation which works under the chief executive deals with general statistical problems, undertakes statistical studies common to different units and guides the units in such assignments. There are statistical cells attached to the industrial units and the stores organisation. These cells carry out regularly certain analyses regarding break-downs, cost of setting right stoppages and consequential losses, equipment utilisation etc. Specific problems are also taken up for study. They are also associated with the operations research team wherever possible. The analysis and studies conducted by the cells in the units are made available to the unit heads for appropriate action. On the stores and purchase side, A B C analysis and other studies to help inventory control are carried out.

Further the central statistical unit carries out such ad hoc studies and analysis as will help the management in formulating policies and programmes.

17. **Hindustan Cables:** A nucleus Cost Accounting Section exists in the company which attempts to give necessary information to the management and watches day-to-day performance.

18. **Mining & Allied Industries:** No separate management ac-

counting cell has been set up by the company. The management is informed of statistical data and other details by the Accounts Department as also the Central Economic Planning Department on the basis of which programmes and policies are formulated and implemented.

19. **Hindustan Organic Chemicals:** Management accounting and statistical units have not been set up so far by the company. Information on an ad hoc basis is obtained from time to time from the concerned Divisional heads, while formulating general policies and programmes.

20. **Hindustan Antibiotics:** There is no separate management accounting unit or statistical unit at present. The Finance Section and the Costing Section are performing the functions of collection and reporting of data at the moment. Steps are being taken to recruit and post trained persons suitable for the job in those sections so that the procedures can be streamlined and the necessary information forwarded to the management for deciding the policies.

## APPENDIX III

### NOTES ON PRICING IN PUBLIC ENTERPRISES\*

1. **Indian Rare Earths:** The prices of the products of the company are fixed according to the mechanism of the market. The company is free to price its products; the Central Government's approval of the same being not necessary. This is the only industry in the country trading in Rare Earths. The company's main products are mostly exported. The prices have, therefore, to be fixed so as to be comparative in the world markets. While fixing the prices, provision for an element of profit is made over and above the cost of production.

2. **Heavy Electricals:** The undertaking is free to price its products according to the mechanism of the market. Since the customers, in many cases, are the Departments of the Government (Railways, State Electricity Boards, etc.), greater flexibility in the approach of such customers would be of help. This, according to the company, could be achieved, if the strong-hold which the Accounts Officers had managed to acquire over spending authorities were broken and the spending authorities themselves were held responsible.

The company was of the view that it would not be practicable for a Central Price Commission to fix prices in their case, as the products were mostly tailor-made to suit specific requirements of power projects. If there was any difference of opinion regarding prices between them and their customers, i.e., Railways, State Electricity Boards, etc., the question could always be referred to the Government.

3. **Bharat Electronics:** It is free to price its products subject to the prices being reasonable. In fixing selling prices, in addition to estimated costs, provision of 10% is made for profit. Against individual indents from the various Government Departments, BEL sends its quotation which, after examinations, is accepted. Under these circumstances, apart from the indentor's right to scrutinise and accept the prices, price fixation as such does not require approval by the Government.

4. **Fertilizer Corporation of India:** The retention prices of

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\*Based on information collected from official records and personal interviews.

fertilizers are fixed by the Government of India after detailed cost examination by the Chief Cost Accounts Officer of the Ministry of Finance. The system of fixation of price has not been found to be quite satisfactory from the Corporation's point of view for reasons mentioned below :

- (i) The profit element allowed in the price of the Corporation is based on 10% of the capital employed. Since the tax liability of the Corporation in terms of the prevailing rates is about 50% of the assessable income, the net profit after tax on the above basis would be reduced to only about 5% of capital employed which does not seem to be adequate for self-financing of new projects considering that fertilizer plants generally involve heavy initial capital outlay.
- (ii) The profit margin of 10% is worked out on the capital employed as adjusted by assuming the working capital artificially as equivalent to four months production costs. Since the high inventory of plants spares is unavoidable for fertilizer units owing to their foreign origin and the prolonged procurement time, the adjustment of the working capital for purpose of profit margin, adversely affects the profit earning capacity of the Corporation.
- (iii) The existing pricing policy does not take adequate notice of the current inherent deficiencies in plant capacities such as at Sindri.
- (iv) The current retention prices were fixed for a five year period from 1st April, 1962. No provision has been made for escalation on account of statutory price increase in raw materials. There has been progressive increase in the price of coal. They have also had to pay heavy sums to workmen at Sindri on account of the Industrial Tribunals Award which has statutory force. Railways have increased the freight on coal and other commodities including gypsum. These increases have to be absorbed in the price resulting in reduction of the already meagre profit element allowed to the Corporation. With the Government's recent decision to entrust marketing and pricing of fertilizers to the manufacturing units, it may be possible to rectify the present imbalance in the price structure by distribution of fertilizers in the economic marketing areas. In view of the Government's directive that prices to the farmer should not be increased, the Corporation's profit earning capacity is not likely to improve since the current prices to the farmers are largely regulated by the retention prices so far allowed to the F.C.I.

5. The National Small Industries Corporation: So far as the business of hire-purchase is concerned, the present terms and conditions require the approval of the Ministry. The pricing of job

orders executed in the Proto-type Production and Training Centres as well as the machine tools manufactured, is done by the Corporation on the basis of costs and market prices.

6. **Indian Oil Corporation (Refineries Division):** The prices of main raw material, viz., crude oil, and finished products are regulated by the Central Government. The Corporation has no discretion to alter them. The prices of the company's products are fixed on the basis of the recommendation of the report of the "Working Group on Oil Prices" as accepted by the Government.

7. **Hindustan Steel:** The company has been somewhat sore on the way its prices were fixed. The basis for steel price was formulated by the Tariff Commission/Government in 1962 as follows:

<i>The price of steel per tonne as fixed by the Tariff Commission</i>		<i>The price of steel per tonne produced by the HSL on the same basis would be</i>	
Works cost	Rs. 357	Works cost	Rs. 357
Other expenses	Rs. 12	Other expenses	Rs. 12
Depreciation at 5% on Rs. 1176	Rs. 59	Depreciation at 5% on Rs. 1900	Rs. 95
Return at 8% of Rs. 1176	Rs. 94	Return at 8% on Rs. 1900	Rs. 152
<b>Total</b>	<b>Rs. 522</b>	<b>Total</b>	<b>Rs. 616</b>

The Tariff Commission did not take into account the capital base of the HSL which was already Rs. 1,900 per tonne as far as its profitability was concerned. The HSL, therefore, started with a basic handicap of Rs. 94 per tonne from the start of its production, because of the pricing policy.

Thus whilst the two well established private sector plants were given a price inclusive of cost plus return on capital, the HSL was asked to produce its return on capital on the basis of works cost of the private sector plants. No allowance was made even for the additional depreciation.

The HSL did not press for any revision of the prices except for rises by way of freight and excise duty.

(Rise in costs due to other factors, such as raw materials, wages, electricity, and so on were absorbed through reduction of operating costs but this could not be continued for ever when the general price index was rising). The HSL was expected to operate at an average works cost of Rs. 263 per tonne in 1961-62, i.e., at nearly 30% less than same in the TISCO & IISCO. During the period 1961-62 to 1964-65 the company's works cost per tonne of saleable

steel on weighted average basis came down by Rs. 50 while the same of the TISCO went up by Rs. 16 and that of the IISCO's by Rs. 31 per tonne. HSL's works cost was about 6% less than that of the TISCO & IISCO. This was so in spite of a rising trend of general costs, during this period. Thus the price of coal and iron ore increased by about 41% and 100% respectively during 1961-65. During the same period wages registered an increase of about 35%. Apart from that, there was a substantial increase in excise duty and freight during this period as shown below:

### IMPACT OF GOVERNMENT IMPORTS ON STEEL

#### (A) INGOT

Details	1948-49	1964-65	Increase in 1964-65 over it
	Rs.	Rs.	
1. Duty & Levies			
(a) Excise Duty (Ingot)	4	41	37
(b) Other Levies (Royalty Cess, Import Duty, Taxes, etc.)	2	10	8
	6	51	45
2. Total : (a) and (b)	6	51	45
3. Railway Freight on materials	13	43	30
4. Total (2 and 3)	19	94	75
5. Works cost (excluding Excise duty)	96	247	151
6. Works cost (including Excise Duty)	100	288	188
Duties etc. as a percentage of Works Costs (including Excise Duty)			
(i) Excise Duty Imposts and Levies	6	18	—
(ii) Railway Freight	13	15	—
(iii) Total Imposts and Railway Freight	19	33	—
(B) SALEABLE STEEL			
1. Excise Duty (ingot)	5	51	46
2. Product Excise Duty	—	56	56
3. Railway Freight (Materials)	17	56	39
4. Other levies, such as Royalty Cess, Import Duty, Taxes, etc.	4	19	15
Total	20	182	156

In view of the above, the Company feels that the Government should keep the following in view while fixing the prices of its products. The HSL having been set up recently with tied up loan at virgin sites, its capital cost has been heavy. Therefore, its total cost of production including depreciation and interest is high. This is what it has cost the country to set up these industries. This cost has to be shared between the producer, consumer and the Government. If the Government intends to continually mop up the results of better operations, by increasing excise duties and is unable to check the continuous rise in freight by the Railways, the continuous rise in wages and cost of living, the continuous demand for higher prices by the producers of iron ore and coal, then no relief to the consumer will be forthcoming. After a while this may act as a disincentive to the secondary industrial activity depending on the intermediate goods and services produced by public sector and thereby affect the sales and production of the undertakings.

For the same reason the Government has also to adopt a rational decision as to how far these costs have to be loaded between inter-dependent public undertakings. It is not possible for the National Coal Developments Corporation to work on a cost plus profit basis, and increase their prices while the HSL cannot increase its prices. Similarly, if the Heavy Engineering Corporation also adopts a price policy on cost plus profit basis, the capital equipment which will go into the new industries will inflate the capital structure of the undertaking from the beginning. It is quite illogical for one public undertaking to make profit at the cost of another. It does not help the total national economy and distorts the evaluation of performance of all the undertakings.

**8. Hindustan Salts:** The company has full autonomy to fix the selling prices of its products without the Central Government's approval. The method so far adopted is to adjust price against cost of production; not so much according to the mechanism of the market. The company has not so far experienced any difficulty in pricing its products manufactured at the Sambhar Lake. The situation is, however, quite different in the case of Kharagoda Salts. In view of the mushroom growth of the Co-operative Societies around Kharagoda who hardly pay any Government cess, the company has to face severe competition with the producers in the private sector, with the result that it is not able to sell its products at a profit. Unless it is able to cut down its overall costs drastically, it will be left with very little profit margin on its sales. This will be possible only when the entire Salt Works is realigned at a cost of Rs. 20 lakhs or so.

**9. National Coal Development Corporation:** Coal is primarily a controlled commodity. The prices of high grade coal up to grade I are controlled, while ceilings have been fixed in the case of low-grade coal, viz., Grade II, III (a) and III (b) except in M.P. where even the price of these grades is controlled. As

regards coal for which either there is no price fixed or where the price fixed is only a ceiling, direct negotiations are done keeping in view the cost of production and a reasonable return on the capital. Government approval for such fixation is not required.

**10. Heavy Engineering Corporation:** The Corporation is free to price its products to suit the mechanism of the market and no approval from the Central Government for its pricing policy is required under the Articles of Association of the Corporation. The pricing policy is under the constant review of the Corporation's management. In the case of items which are manufactured by other manufacturers also, there is a built-in control over their pricing, viz., the market rate. In case of products which are not manufactured by other producers, the management had decided to price the products at landed cost basis in order that the Corporation could compete with similar imported goods. In the case of other products the prices of which are fixed by negotiation with customers, the Corporation often could also face some difficulties.

**11. Fertilisers & Chemicals, Travancore:** So far as its major products are concerned, the company is governed by the price fixed by (or in consultation with) the Government of India. In the case of superphosphates, the price is fixed by the Fertilizer Association of India. In the case of ammonium sulphate, a partial decontrol has been introduced from October, 1965.

**12. Indian Telephone Industries:** There is no statutory control on the price of the products of this company. However, the bulk of the company's products are sold to the Posts and Telegraphs Department who in the last analysis determine the basis for pricing.

**13. Central Road Transport Corporation:** In a transport organisation like this the procedure of rigid fixation of transport rates is not possible as the rates are subject to fluctuation during busy and off season due to open market competition.

There is no uniformity in the freight structure for goods transport obtaining in different routes, especially the international routes. The freight rates are governed in most cases by unhealthy open market competition, as a result of which transportation work has to be undertaken in some cases even at the rate which does not cover the cost of operation, in order to avoid detention/idleness of vehicles.

**14. Neyveli Lignite Corporation:** The Government's approval is necessary for pricing to their products of the Corporation. At present, the price of only one product LECO can be fixed according to the mechanism of the market. In fixing the price of this product and the by-products that will be produced in the B. & C. plant the Government have agreed to the price being fixed by the Board.

**15. Hindustan Machine Tools:** The prices of the company are fixed in consultation with the Ministry concerned. These prices were fixed in 1963 at about 15% below the landed cost of

their collaborator's machines. The present prices revised after devaluation are about 50% of the FOB prices of imported machines.

16. **Hindustan Organic Chemicals:** In the original Project Estimates pricing was done on the basis of CIF plus 50% in respect of all the products which are being imported at present. Later, after devaluation, the prices were revised on the basis of CIF plus 15%. On this basis, some of the products will have to be sold at a loss. As a majority of items required for their manufacture are imported the present prices, fixed on the above basis, are rather high. If the company were free to price according to market mechanism, its profitability might, perhaps, have been higher.

17. **Hindustan Antibiotics:** At present, the selling prices of the products manufactured by this company are controlled by the Central Government under the Drugs Prices (Display & Control) Order, 1966. The company is sore about the fact that whereas the Government has controlled the end prices of the products there has been no control over the costs of either raw materials or other services to be purchased by the company. The company feels that it should be given at least as much freedom as in the case of private individuals to fix the selling prices, within certain general broad accepted principles. Without that freedom, the profitability of the organisation and the return on capital invested by the Government cannot improve or even be maintained for long.

## APPENDIX IV

### NOTES ON BUDGETARY PRACTICES IN PUBLIC ENTERPRISES\*

1. **National Industrial Development Corporation**: The annual budget of the Corporation is prepared by due date, viz., in the month of September each year. It relates to transactions pertaining to loan operations and administrative and establishment expenses and receipts of the Corporation mainly from loan operations and for services rendered by Technological Consultancy Bureau Wing of the Corporation.
2. **Indian Rare Earths**: The annual budget is prepared before the beginning of the financial year. The budget indicates the physical targets and production schedule to be achieved during the year. The expenditure is related to the level of output in case of items directly related to production such as raw materials, etc.
3. **Heavy Electricals**: The annual budgets are prepared during September-October of every year and so far there has been no delay in their preparation. The capital budget is based on the construction and erection programme. The revenue budget is based on the anticipated production programme indicating the physical targets to be achieved.
4. **Fertilizer Corporation of India**: The revised estimate for the current year and budget estimate for the next year are prepared simultaneously during August/September each year. The budgets are related to production schedules prepared in advance, and expenditure estimates in respect of raw materials and consumable stores, etc., are related to consumption norms fixed for various products.
5. **Indian Oil Corporation**: The budget estimates of the next year and the revised estimates of the current year are prepared in June-July every year. The revenue budget is always related to production schedule and anticipated sales of products. The variable expenses like raw materials, chemicals, stores, etc., are estimated with reference to the level of output, anticipated in the budget.
6. **Export Credit & Guarantee Corporation**: It has been the

\*Based on information collected from official records and personal interviews.

practice to present the budget of the Corporation at the beginning of the year to the Board of Directors for its approval. The following factors are taken into consideration in preparing the budget: (i) actual expenses incurred during the previous two years and (ii) anticipated expenses for the budget year.

It has been decided to include income also in the budget, though it is very difficult to forecast, as it is dependent on so many factors some of which are of an international character. It has also been decided to prepare the budget by October of the preceding year instead of the beginning of the budget year.

#### 7. Hindustan Steel :

(a) The budget of the company is phased in 3 stages: (i) Basic programmes (ii) Subsidiary programmes (iii) Budget estimates—original and revised.

(b) The budget calendar is as follows:

By July 31: (i) Actuals of previous year (ii) Revised estimates for current year (iii) Budget estimates for next year.

By December 15: (i) Revised estimates for current year (ii) Revised estimates for next year.

By February 28: Final estimates for current year.

By March 10: Telegraphic modifications.

The budget programme comprises Basic Programmes and Subsidiary Programmes covering the Production and Service Departments and Personnel requirements.

The budget programme, which conforms to the known policies of the Board, is accompanied by a summary and memorandum which sets forth briefly its principal features.

The programme and consequential estimates are accompanied by a financial analysis by the F.A. & C.A.O. and the views of the General Manager. At the headquarters the budget is examined by the different Departments. The budget controller co-ordinates the budget scrutiny and submits a final analysis to the Budget Committee and the Board of Directors as programmed.

8. **Hindustan Insecticides:** The annual budget is placed before the Board of Directors during November-December. The budget is related to a production schedule giving physical targets. The orthodox flexible budgeting has not been attempted as the percentage of capacity utilised more or less remains constant; otherwise expenditure estimates are related to the level of output.

9. **Hindustan Salts:** The company's accounting year is from October to September in each year. The budget estimates of the units are prepared each year in September. There are always delays in the submission of such detailed budgets by the units for some reason of the other. The production of salt is dependent on rains

which is uncertain and this accounts for the delays. The budget is prepared in relation to production and appropriate physical targets and the estimates of expenditure are prepared in relation to the level of output. The variations are explained at the time of revised estimates as well as at the time of submission of final estimates.

10. **National Coal Development Corporation:** The annual Capital Budget of the Corporation is due for submission to the Government in October every year. The Capital Budget is related to the capital outlay planned for a particular year within the framework of planned targets. The Revenue Budget which is prepared in relation to the production schedule and expenditure estimate is confined to the revenue expenditure. The Revenue Budget is placed before the Board of Directors in December-January every year.

11. **Fertilisers and Chemicals, Travancore:** The annual budget of the company is generally prepared in August-September each year. Alongwith the budget, a production schedule and approximate physical targets are also assessed so that expenditure estimates can be linked to revenue.

12. **Petroleum & Chemicals:** The Oil and Natural Gas Commission is required to submit its budget proposals to the Government by the 15th of October, which on request may be extended up to the 31st of October. The receipts for the sale of crude oil and gas are taken into account while preparing the budget estimates. The budget estimates are also related to the physical targets of work of the Commission.

13. **National Mineral Development Corporation:** The Corporation is required to furnish the revised estimates of the current year and the budget estimates of the next year to the Ministry by 25th August every year. All projects except the Kiriburu Iron Ore Mine are in the construction phase. For the Kiriburu Mine a revenue budget is prepared on the basis of the physical targets of production. The estimated expenditure of this budget is related to the level of output, production and sales. Costs and cash budgets are prepared along with the capital budgets every year by August comprising the revised estimates for the current year and budget estimate for the following year.

14. **Indian Telephone Industries:** The company prepares its budget programmes in October-December every year and submits the same to the Board of Directors for approval. The budget of the Company comprises (i) Capital Programme (ii) Replacement and Renewal Programme (iii) Sales Budget (iv) Production Programme (v) Revenue Budget (vi) Purchase Budget (viii) Ways and Means Budget.

Alongwith the budget, revised estimates for the current year are also submitted to the Board with reasons for any significant variances.

The budget proposals are related to the physical targets and contain supplementary schedules giving detailed justification for the various items of expenditure.

15. **The Minerals & Metals Trading Corporation of India:** The budget estimates are put up to the Board within the first quarter of the year. This is reviewed towards the middle and again in the last quarter of the year. The delay in preparing the budget is due to the time-lag in finalisation of contracts with the foreign buyers. Trade forecasts are related to anticipated targets. Due to various problems of trade, it is not always possible to link the expenditure with the turn-over although such comparisons are made from time to time.

16. **Central Warehousing Corporation:** The Corporation is required to prepare its annual budget estimates and submit the same for approval of the Central Government before the 31st of December, i.e., at least 3 months before the commencement of each year. The budget is related to a business schedule and takes into account the business potential likely to develop during the next year and the capacity to be hired or constructed by the Corporation.

17. **Neyveli Lignite Corporation:** The annual budget of the Corporation comprising the revised estimates for the current year and the budget estimates for the following year are finalised by the middle of September every year. The production budget of the Corporation is related to the production schedule and physical targets. These are finalised with reference to likely sales and the production capability of the plants concerned. The expenditure estimates are then worked out based on the volume of output decided for each unit. Capital budgets are also based on physical targets for the various components of construction.

18. **Indian Oil Corporation (Refineries Division):** The company has just started commercial operations. They prepare an annual operating budget which is related to the level of output. They have also, formulated procedures for comparison of budgeted expenditure and the level of output with actual attainment. These are reviewed and revised frequently, particularly during the early stages of operation.

19. **Bharat Heavy Electricals:** The company's revised budget for the current year and the budget for the subsequent year is prepared by the Departments in August/September and placed before the Board in September/October. The revenue budget of the Company is usually placed before the Board alongwith the capital budget and is related to the out-turn and the production schedule. The components of the revenue budget comprise the Production Budget, Material Budget, Labour Budget, Overheads Budget and Sales Budget.

20. **Bharat Earth Movers:** The company's budgets are prepared and presented to the Board of Directors every year around February/March depending upon the date of the Board of Directors

Meeting. They comprise Capital Budget, Sales and Production Budget and Ways & Means Budget. The Production & Sales Budget is related to the level of output.

21. **National Mineral Development Corporation:** The Corporation is required to prepare capital budget by the middle of October. The revenue budget is handled at the Corporation level and the approval for the same is obtained from the Board of Directors. The budget is related to the production schedule and the fiscal and budget provision is related, after scrutiny, to the actual requirements based on the anticipated level of output.

## APPENDIX V

### LIST OF STATEMENTS IN THE BUDGETS OF SOME ENTERPRISES

#### I. The Bihar State Electricity Board (1964-65)

##### PART I

1. (a) Budget Statement I—Abstract of Capital Receipts and Expenditure
  - A. Receipts
  - B. Expenditure

(b) Annexure I to Budget Statement I-A; Statement of Loans received from Government under Section 64 of the Electricity (Supply) Act, 1948

(c) Annexure II to Budget Statement I-A; Statement of Borrowings under Section 65 of the Electricity (Supply) Act, 1948

(d) Annexure III to Budget Statement I-A; Statement of Debts and Deposits Transactions

(e) Annexure I to Budget Statement I-B; Statement of Loans and Advances to Licensees under Section 23 of Electricity (Supply) Act, 1948

(f) Annexure II to Budget Statement I-B; Statement of Loans and Advances to Employees

(g) Annexure III (Details by Sub-Heads) to Budget Statement I-B

(h) Schedule I to Budget Statement I-B; Schemewise details of Capital Expenditure

(i) Schedule II to Budget Statement I-B; Expenditure on Power Schemes included in the Third Five Year Plan
2. (a) Budget Statement II—Abstract of Revenue Receipts and Expenditure
  - A. Receipts
  - B. Expenditure

(b) Annexure I to Budget Statement II; Schemewise details of Revenue Receipts and Expenditure

- (c) Annexure I to Budget Statement II-A; Forecast of Revenue by detailed classification
- (d) Annexure II to Budget Statement II-A; Forecast of Revenue by H.T. Consumers and L.T. Consumers
- (e) Annexure I to Budget Statement II-B; Statement of Operation and Maintenance Expenditure — Administration and General Expenses
- 3. Budget Statement III—Abstract of Net Revenue Surplus
- 4. Budget Statement IV—Statement Apportioning Expenses of Rates and Taxes, General Establishment, Administration to Major Heads of Revenue Account

## PART II

- 1. (a) Establishment Schedule of regular Staff
- (b) Establishment Schedule of Workcharged Staff
- 2. Annual Statistics :
  - (a) Statement I—Particulars of Generating Plant
    - A. Generating Plant Owned and Operated by the Board
    - B. Generating Plant Controlled by the Board (Nil)
  - (b) Statement II—Particulars of Board's Transmission Lines
  - (c) Statement III—Particulars of the Board's Distribution Lines
  - (d) Statement IV—Particulars of Transformers
  - (e) Statement V—Particulars of the Board's Electricity Productions, 1962-63
  - (f) Statement VI—Particulars of consumers served directly by the Board
  - (g) Statement VII—Particulars of Board's Electricity Production, Supply And Line Losses
  - (h) Statement VIII—List of towns and villages electrified in Bihar up to March, 1963—Abstract
- 3. Financial Return of the Operation and Maintenance Schemes :
  - (a) Financial Return of the Operation and Maintenance Schemes (Revised Estimates 1963-64)
  - (b) Financial Return of the Operation and Maintenance Schemes (Budget Estimates 1964-65)

**II. Bihar State Road Transport Corporation  
(1965-66)**

1. Budget grant under the head Revenue Expenditure for the year 1965-66 & Revised Estimates for 1964-65
2. (a) Part I—Capital Expenditure
  - (b) Estimates approved by the Administration and the Finance Departments
3. Budget Estimates for 1965-66 (Revenue Receipts)
4. Revenue (deduct) Working Expenses
5. Capital Contributions of Revised Estimates for 1964-65 & Budget Estimates 1965-66
6. Funds, Deposits and Advances—Revised Estimates and Budget Estimates
7. Fund—Actuals, Revised Estimates and Budget Estimates
8. Summary—Financial Results, Revised Estimates and Budget Estimates

**III. Heavy Engineering Corporation  
(1967-68)**

1. Abstract (Showing the Revised Estimates for 1966-67 and Budget Estimates for 1967-68 for the whole, projectwise)
2. Summary-Statement (Showing the Revised Estimates for 1966-67 and Budget Estimate for 1967-68 Itemwise—Capital Revenue Account)
3. A. Foundry Forge Unit
  - (a) (i) Abstract of Revised Estimates for 1966-67 and Budget Estimates for 1967-68
    - (ii) Details of Deferred Credit and Interest to be paid during 1967-68
    - (iii) Revised Estimates for 1966-67 and Budget Estimate for 1967-68; Details
  - (b) Statement of Revised Estimates for 1966-67 and Budget Estimates for 1967-68, Part II, Production: Cash requirements
  - (c) Proforma—Receipts and Payments Account
  - (d) Cash Loss
  - (e) Profit and Loss Account
  - (f) Statement of Working Capital
  - (g) Production Programme (Unit: tons)

(h) Revised Estimate for 1966-67 (Showing the factorwise distribution of costs incurred on different sections of the project)

(i) Production Budget for 1967-68 (Costs incurred on different sections of the project)

(j) Production Budget for 1967-68 (Showing factorwise costs incurred on different sections of the project)

(k) Direct Raw Materials

(l) Realisation on Sales

### 3B. Heavy Machine Building Project

(a) Abstract—Revised Estimates for 1966-67 & Budget Estimates for 1967-68

(b) Revised Estimates for 1966-67 & Budget Estimates for 1967-68 (For Production)

(c) Proforma—Receipts & Payment Account

(d) Proforma—Cash Loss Account

(e) Proforma—Profit and Loss Account

(f) Production Programme—1966-67 [Showing the quantity (tons), rate per ton, sales value, % of sales & material cost, Itemwise].

(g) Goods in Process of Production for the year 1966-67

(h) Production Programme for 1967-68

(i) Goods in Process-of-Production for 1967-68

(j) Materials Requirement for Production of 1966-67 and 1967-68

(k) Direct Expenses Budget for 1966-67 & 1967-68

(l) Overheads: Details

### 3C. Heavy Machine Tools Projects

(a) (i) Abstract: Revised Estimate for 1966-67 & 1967-68 and Budget Estimates for 1967-68

(ii) Revised Estimates for 1966-67 and Budget Estimates for 1967-68: Construction Details

(b) Revised Estimates for 1966-67 and Budget Estimates for 1967-68: Production-Summary

(c) Receipts and Payments Account

(d) Cash Loss Account

(e) Profit and Loss Account

(f) Statement of Working Capital

(g) Revised Estimates for 1966-67—Production: Details

- (h) Budget Estimates for 1967-68—Production: Details
- 4. Jagannath Nagar Township
  - (a) Abstract Revised Estimates for 1966-67 and Budget Estimates for 1967-68
  - (b) Revised Estimates for 1966-67 & Budget Estimates for 1967-68—Construction: Details
- 5. Heavy Engineering Corporation: Common Charges—Summary
  - (a) Revised Estimate for 1966-67 and Budget Estimates for 1967-68—(Summary)
  - (b) Common Charges—Statement Showing the Details of Revised Estimates for 1966-67 and Budget Estimates for 1967-68 (Showing the expenditure on each division of the Corporation)
  - (c) Statement showing the Details of Revised Estimates for 1966-67 and Budget Estimates for 1967-68 (Providing the break-up of the expenditure on salaries, civil construction, furniture etc.)

**IV. Hindustan Photo Films Manufacturing Co.  
(1967-68)**

- 1. (a) Summary—Capital Budget
- (b) Details of the Capital Budget
- 2. Operation Budget—Revised Estimates for 1966-67 and Budget Estimates for 1967-68
- 3. Revised Ways and Means Budget
- 4. Statement showing the progress of expenditure to end of September, 1966

